



# **The TechCon Program**

## **FINAL DRAFT FY 2000 YEAR END REPORT**



*Prepared by*  
**The TechCon Program**  
**Argonne National Laboratory**



## **ACKNOWLEDGEMENTS**

The success of the Department of Energy's (DOE) TechCon Program is because of the many people in DOE and site contractor teams who seek to change or enhance baseline project approaches by deploying emerging or commercial technologies that reduce costs, improve schedules, and remove risk. Their openness to new alternatives, the use of technical assistance, and participation from regulatory and community stakeholders is the key to real change. We also wish to acknowledge the involvement of community and regulatory stakeholders who provide perspective and insight to DOE's clean-up challenge.

Commercial vendors have been willing to invest time and effort to share important insights gained in their work on similar projects. By participating in broad interactions through vendor forums and web site exchanges, they have increased the understanding and greatly reduced the uncertainty about many technologies.

The continued support and encouragement of the EM-50 Subsurface Contaminant Focus Area and the opportunity to work with other members of the SCFA technical assistance team, including ITRD and the Lead Lab, have provided the essential elements needed for our success. To all who have supported the TechCon program over the years, we say thank you!

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## **Executive Summary**

The TechCon Program increases the number of viable technology-based alternatives available to DOE project teams through the identification and inventory of commercial technology vendors, their expertise, and their experience in similar project settings.

Through TechCon, commercial vendors have documented their relevant project experience and participation in project-specific forums and web interactions. This has led to broader understanding and insight into alternatives available for application to DOE's clean-up problems.

As part of an integrated technical assistance (TA) approach provided by the EM-50 Subsurface Contaminants Focus Area (SCFA), TechCon works with DOE project teams to obtain information and assure critical interactions with commercial technology vendors. This key role eliminates uncertainty and enables change to project baseline approaches. TechCon complements TA provided by the Lead Lab (National Laboratory expertise) and ITRD programs (resources and expertise to eliminate performance data gaps).

In FY 2000, TechCon led five TA projects and supported five additional projects led by the Integrated Treatment Remediation Demonstration (ITRD) program. TechCon was also involved in the DOE EM Needs process by participating in visits to each DOE field office to understand their needs and suggest technology alternatives. Contacts made during these visits led to identification of many future TA opportunities. The TechCon TA approach, described in Section 2.1, provides insight to Program operation, includes descriptions of the TechCon Data Sets, discusses use of the Internet, and shows interface and relationships with other integrated TA programs from SCFA.

### **The TechCon Data Sets**

To respond to TA needs, TechCon utilizes two data sets: a Contacts Database and a Vendor Submittal database that have evolved during the life of the program. The Contacts Database contained more than 950 currently active technology vendors. TechCon uses the database to quickly search for commercial alternatives to solve technology needs. The database also contains access to vendor web sites, key personnel contact information, technologies offered key words to facilitate searches, and a TechCon-prepared profile describing the company and its capabilities.

The Vendor Submittal Database, started in 1998, contains credentials of vendors who submitted their capabilities and one-to-five project histories to specific TA projects. More than 300 vendors have made submittals on 14 projects to date with 230 submittals for eight projects in FY 2000 alone. This information is accessible at the TechCon web site, <http://web.ead.anl.gov/techcon/>. See Section 2.1.1 for detailed discussion of the data sets.

### **The TechCon Web Site**

Effective communication is an essential element of technical assistance and is accomplished through direct interactions in project meetings, vendor workshops and

forums, and the Internet. The TechCon web site was established in FY1996 to enable better communication involving project-specific technical assistance:

- Project teams provide detailed descriptions to stakeholders and vendors.
- Technology vendors submit their capabilities and experience in similar projects.
- Regulatory and community stakeholders gain access and insight to needs and available technology-based alternatives.
- Project teams at other sites and outside of DOE stay abreast of developments.
- Interested parties participate in active dialogue about screening, selection and deployment of solutions.

Section 2.1.2 discusses the TechCon web site.

### **HIGHLIGHTS OF ACCOMPLISHMENTS IN TECHCON-LED TECHNICAL ASSISTANCE PROJECTS**

#### **Oak Ridge DNAPL in Fractured Bedrock and Carbon Tetrachloride in Groundwater at the Y-12 Plant**

The Oak Ridge DNAPL project is a joint TechCon/ITRD TA project initiated in FY1998. Carbon tetrachloride, with sources in fractured bedrock and contaminated groundwater at a 500-ft depth, has resulted in contaminants day-lighting off the reservation. The joint TA effort focused on ways to stop off-site migration, accelerate treatment of contaminated groundwater, and treat the DNAPL source term. As a result of vendor data gathered and treatability studies conducted in FY 1999, primary interest focused on bio-stimulation and bio-augmentation. Work in FY00 supported preparation for a bioremediation pilot project in FY01. ITRD maintained Technical Advisory Group (TAG) activities in characterization, bioremediation, and modeling. TechCon participated as a TAG member, maintained the project web site, and interfaced with bioremediation vendors. A Bioremediation Vendor forum was scheduled for early FY01. With pilot scale deployment expected in FY01, TA is expected to continue through FY02.

#### **Portsmouth Bioremediation of Trichloroethylene in Groundwater**

Technical assistance to the Portsmouth site for implementation of bioremediation in Quadrant I, including the X-749/X-120 areas, was begun in late FY00. This effort focused on rapid identification of commercial vendors in bioremediation and delivery systems who could move forward with pilot and full-scale deployment in FY01. TechCon included ITRD and the INEEL Bioremediation ASTD in the effort. After searching the Contacts Database and obtaining a preliminary list of 50 candidates, TA began in September 2000. The work included development of a web site and contact with potential vendors to participate in a vendor forum in December 2000. Because of similar work at the Oak Ridge DNAPL project, members of that TAG were invited to participate in the forum.

### **Mound Old Cave Characterization through Concrete Walls and Floors**

As a result of the TechCon Characterization Initiatives web site data, the Mound TA was initiated in January 2000 to determine the range of experienced vendors who could conduct non-intrusive characterization through concrete walls and floors. Because a rapid deployment was required, TechCon created a web site that facilitated interactions between the BWXTO prime contractor and commercial vendors. A notice was posted in Commerce Business Daily (CBD) and a Request for Proposal (RFP) issued for geophysical characterization technologies to locate contaminants and containers. The web site was the only source used for a list of interested, pre-qualified sources. The web site also confirmed the merits of two vendors already under consideration. Rapid deployment occurred with their two technologies. Realigned priorities will place more emphasis on characterization of the entire SW building containing the Old Cave area in FY01. A vendor forum may be required in early FY01 with TA required through the second quarter.

### **Brookhaven National Laboratory Peconic River Remedial Alternatives**

BNL requested TA in July 2000 after a preliminary remedy for sediment excavation and off-site disposal for the OU-5 project was rejected by regulatory and community stakeholders. TechCon was asked to conduct a Peconic River Remedial Alternatives Workshop to explore available alternatives. The TechCon Contacts Database indicated that 80 vendors met screening criteria for alternative technologies that included phytoremediation, wetlands restoration, and electro-kinetics which should be considered as well as developments in sediments removal techniques for minimizing migration and resuspension. A TA Memorandum of Understanding (MOU) was signed in September and a web site was designed for data collection in preparation for a December workshop. After the workshop in FY01, it is expected that TA will be required for continued vendor interactions leading to preparation of pilot demonstrations. A ROD is currently scheduled for September 2000. Technical assistance is anticipated to continue through FY02.

### **Minimally Intrusive Characterization at Active TA Sites**

As the result of a need for better characterization data in each of the active TA projects supported by ITRD and TechCon, and even broader needs evident from the DOE Needs Management System, it was determined that little awareness of commercial tools for minimally intrusive characterization existed. In follow-up to the TechCon Forum on Mercury Remediation in FY99, when characterization was a major issue, two commercial technologies had created significant interest at several sites. Because of pending characterization needs at Oak Ridge, the PMRAM and EMR technologies were funded by the site for validation tests. Broader interest from other sites led to the addition of the Ashtabula and Fernald sites further validation of the PMRAM. PMRAM pilots were conducted at Oak Ridge ETTP, Ashtabula, and Fernald in early-mid FY00 and the EMR technology was piloted at Oak Ridge in late FY00. The ASME peer review committee was asked to review the technology and validation data. The review was conducted in late

FY00 and a report is expected in FY01. Site validation data from traditional sampling and analysis was delayed until FY01. The Characterization Initiatives TA effort will be ongoing, as characterization remains an essential prerequisite to project remedy selection.

## **HIGHLIGHTS OF ACCOMPLISHMENTS IN TECHNICAL ASSISTANCE PROJECTS SUPPORTED BY TECHCON**

### **Hanford 100-N Area Strontium in Groundwater**

The ITRD Program established a TAG in March 1998 to investigate and recommend a strategy and technology alternatives for final remediation of strontium in groundwater and soil. TechCon has been a member of the TAG since the project started with the task of identifying and documenting commercial characterization and remediation technologies including impermeable barriers, soil flushing, stabilization, phytoremediation, and natural attenuation. Characterization continued as a major issue blocking identification and evaluation of individual technologies. The TechCon web site provided communications between the TAG and vendors of interest. The project web site (<http://web.ead.anl.gov/techcon/projects/gwater/>) was maintained during FY00. New vendor submittals were received during the year. Characterization activities of the TAG have delayed a vendor forum. TechCon facilitated interactions with characterization and remediation technology vendors during the TAG meetings.

### **Hanford 200-N Area Carbon Tetrachloride in Groundwater**

ITRD initiated an effort in January 1999 to investigate and recommend technology alternatives for final remediation of carbon tetrachloride in the groundwater and DNAPL contamination. TechCon continued as a TAG member focusing on minimally intrusive characterization technologies as well as bioremediation and hydraulic containment. Characterization was the dominant issue throughout FY00. TechCon maintained the web site to gather relevant vendor [experience](#) and provide a communications tool between the TAG and vendors of interest. (<http://web.ead.anl.gov/techcon/projects/ccl4/>) Limited new submittals other than characterization were received from vendors during the year. A Vendor forum was postponed indefinitely.

### **Paducah TCE and Technetium in Groundwater**

ITRD initiated this project in February 1999 to identify and evaluate technologies and strategies for three groundwater plumes contaminated with trichloroethylene and technetium-99. The TAG was to investigate and recommend alternatives for remediating two different zones associated with these plumes. TechCon continued as an original member of the TAG and participated in review of the Technology Summary Report and recommendations to proceed with the C-spargers pilot study. TechCon maintained the project web site established in FY1999 to gather relevant vendor capabilities and project histories and provide a communications tool between the TAG and vendors of interest (<http://web.ead.anl.gov/techcon/projects/tce/>). Vendor submittals were received during this



year. This site will likely participate in the bioremediation vendor forum in FY01 to further consider bioremediation for application to the northeast plume.

### **Pantex and LANL High Explosives in Soils**

ITRD has been providing TA to the Pantex and LANL sites on high explosives since 1998. Web sites supporting these projects were established in FY99 and vendors were invited to provide input on their capabilities and relevant experience. Because of increased activity at other technical assistance sites and a lack of interest in further work with any of the vendors at this time, the two TA projects were designated as completed for TechCon in FY00. ITRD and the Lead Lab are carrying on additional work. No further involvement has been identified for TechCon at this time.

### **Mound Preliminary Remediation Site 66 (PRS-66) Alternatives**

In July 2000, the DOE-OH and BWXTO project teams requested TA from ITRD and TechCon to evaluate remediation alternatives for PRS-66. TechCon supported the evaluation of geophysical characterization alternatives that would be part of the TAG process. The four areas of interest derived by the TAG early in the TA process included endpoint determination, geophysical characterization, soil washing, and excavation. TechCon will continue to support the PRS-66 TAG in FY01 as part of its overall TA approach to DOE-OH and other MEMP TA projects.

## **1.0 INTRODUCTION**

The TechCon Program was initiated in FY92 by the Department of Energy (DOE) Office of Environmental Restoration to include relevant technologies from commercial vendors to those emerging from the DOE Office of Science and Technology's (OST) commitment to develop, demonstrate, and deploy new technologies. The combination of emerging and commercial technologies presents a comprehensive set of alternatives for consideration by project teams. In FY98, TechCon was integrated with the ITRD and Lead Laboratory programs under the OST Subsurface Contaminants Focus Area (SCFA) Technical Assistance (TA) initiatives.

Frequently commercial technologies are not considered for deployment at DOE sites because of (1) insufficient documentation of operational experience, (2) unawareness of the technology, (3) limited technology-specific expertise within the DOE project team and (4) inadequate communication between project teams and vendors. The TechCon Program has been successful in overcoming these obstacles by providing relevant technology-based alternatives.

### **1.1 MISSION STATEMENT**

The mission of the TechCon Program is to provide technical assistance to DOE site clean-up project teams in their deployment of commercial technologies that reduce cost, improve schedules, and minimize risks. This is accomplished through a systematic approach of actions and interactions among project teams, commercial vendors who provide technology-based alternatives, and other stakeholders. Technical Assistance enables project teams to change or enhance baseline cleanup approaches by using one or more technology-based alternatives.

## **2.0 PROGRAM OVERVIEW**

### **2.1 TechCon Technical Assistance Approach**

TechCon provides TA to DOE project teams when problems and technology needs have been identified at a particular site. TechCon identifies commercial technologies with established success records in similar operating environments, and supports the documentation, screening, and selection of the most appropriate solutions through a systematic process of actions and interactions that result in successful technology deployment. Technical Assistance requests are prepared with a scope of work and discussion of the expected outcome. Potential requests are screened for suitability by TechCon, ITRD, or Lead Lab TA programs. The screening criteria include:

- a remedy decision in less than 2 years
- active project funding commitment
- potential for changing the baseline

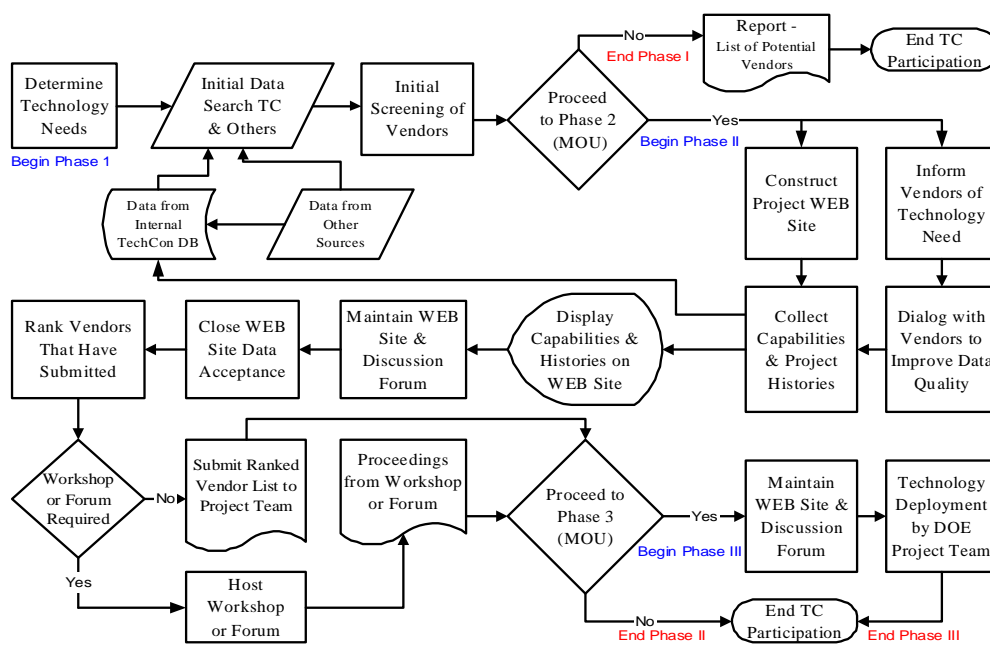
- TechCon resources are available
- availability of good commercial alternative candidates
- relevance to the SCFA topical areas

When screening criteria are satisfied, the TA request is submitted to SCFA for concurrence before work can proceed. Because TA can pass through multiple phases, requests may be required for a single project, or several phases can be included in a single request.

The first step is to determine if commercial technologies exist for potential applications to a particular project. TechCon staff search the Contacts Database to obtain a list of potential vendors. A successful search is followed by preparation of a TA scope of work that describes the role of the site project team, TechCon, and other potential stakeholders. The expected outcome of TA is to support efforts that augment or replace baseline approaches with commercial technologies. TechCon has no authority to make decisions and cannot control technology deployments. Providing relevant information and facilitating interactions among the most qualified vendors affords the greatest opportunity for achieving successful deployment.

The core knowledge for TechCon TA rests with the staff's experience and the content of the TechCon Data Base which consists of two separate data sets: the Contacts Database for use only by TechCon staff, and the Vendor Submittal Database of company descriptions and project histories. Both are explained in Section 2.1.1.

### Technical Assistance Approach



### **2.1.1 THE TECHCON DATA SETS**

The TechCon Database consists of two data sets: The Contacts Database, accessible only by TechCon staff, includes records of specific vendor contacts, their technologies, web site, addresses, and key personnel. The Vendor Submittal Database is available to all project teams and stakeholders and is accessible through the TechCon web site at <http://web.ead.anl.gov/techcon/>. It contains information submitted by technology vendors, their capabilities, and project histories detailing where their technologies were applied. Vendors submit this information to specific TA projects. More than 300 vendors submitted their capabilities to 14 TA projects as of the end of 2000

#### **2.1.1.1 Contacts Database**

In 1993, a flat file electronic index card program was established to track companies contacted by TechCon in its search for relevant commercial technologies. In 1996, TechCon published its first web site which was used primarily to inform potential vendors about the TechCon Program and current DOE technology. It was also used to convey information to DOE project teams. Early in 1997, the need to manage individual projects through the Internet became evident. The first web-based project was the INEEL Pits & Trenches. The Vendor Submittal Database was created to enable vendors to submit their capabilities directly via the web. The system worked well and supported a Vendor forum in January 1998. The flat file database was replaced by the relational database in mid-1998. When the data were transferred to the new database, there were approximately 1,700 technology entries. Each technology contact was entered as a new record, even if other technologies for that company already existed. In early 1999, a web interface was set up allowing access to all TechCon staff. By the end of 1999, the database had grown to more than 1,750 records.

The Contacts Database includes technology names, company name, address, contact, telephone, notes recording results of contacts, links to the vendor's web site, email addresses for key contacts, a brief technical summary written by TechCon, key words, date the entry was created, date of last edit, last contact with the vendor. Checkboxes to identify the type of company, technology, and contaminants to enable computer searches are also included. Information can be added, changed, or searched through the Internet by TechCon staff. There are two separate web interfaces for maintenance and searching the database. TechCon can search Key Words, Technical Summary, and the Notes fields for any text string or by company name. This tool is used to quickly search for specific projects. It also contains links to any data submitted by the company to the Vendor Submittal database.

The databases have proven valuable in the operation of the TechCon Program. They are believed to be the most current and comprehensive databases available in remedial technology because of their high usage rate and integrated maintenance of data.

## Status of the Contacts Database

All records were reviewed during FY 2000. Duplicate entries were removed. Many companies were no longer in business, merged, or acquired. Technical summaries and key words were updated. TechCon personally contacted approximately 270 companies in addition to a review of their web sites. An effort was made to obtain the URL for each company's web site, current contact, and email address. Access to company web sites has been an excellent tool to rapidly review their technology or capabilities. Data quality improved, numerous changes were made to the web interfaces for ease in adding, editing, or retrieving information. The upgrade was completed at the end FY 2000. Duplicate entries, company failures, mergers, and acquisitions caused removal of entries from the active to an inactive database. The following table shows major changes in the Contacts Database that occurred in FY 2000.

Description	FY00 Beginning	FY00 End
Number of records	1,775	950
Records with web URL	211	854
Records with email address	482	657
Non-current records for archival purposes	208	413

### 2.1.1.2 Vendor Submittal Database

Candidate technologies available for use in environmental remediation and restoration are constantly changing as new technologies are developed and others abandoned. A search of a company web site may not present all of the newest technology tools a vendor has available. TechCon developed a submittal process that allows vendors to present their project-specific technology experience via the Internet. Advantages of this process are:

- reduced data collection time and effort
- current data is collected and maintained vs. older, potentially obsolete data
- vendor data submittal with customer verification contacts minimizes errors
- data is immediately available to DOE project team and stakeholders
- immediate contact is established with experienced personnel

In the Vendor Submittal process, the vendor is asked to submit a Capability Statement with an overview of their experience for the specific TA project. Vendors provide company name, key technology, contact person, telephone number, address, web site URL, and email address. Several checkboxes indicate type of company and services provided. Mission statements are discouraged. Vendors are asked to provide histories of one to five completed projects (and strongly encouraged to submit at least three) relevant to the current TA project. TechCon's mission is to find mature, commercially available technologies. By accessing histories of successful projects, the DOE project team gains

confidence that the vendor's technology is mature and can be considered for deployment. In addition to technology performance, the vendor is asked for:

- Site name
- Site location
- Project start and end dates
- \*Customer
- \*Contact name
- \*Contact phone number

Customer Contact\* information can be used by TechCon and the DOE project teams to check references but is not published on the Internet. TechCon has a ranking system that is weighted on the relevance of one-to-three vendors histories to the subject TA project. This system has been helpful in selecting a vendor's participation in a forum. Twenty-five to seventy-five vendor Capability Statements were received for typical TA projects. A forum generally has 12-16 invited technology presenters.

### **Vendor Submittal Database Status**

During FY00, eight active TechCon TA projects received data into the Vendor Submittal Database. The following table summarizes vendor submittals for FY 2000 and since the beginning of the web-based submittal process in 1998. Two TA projects initiated during the last quarter of FY 2000 will result in a forum or workshop in FY2001. Submittals for these projects are not included in this table.

<b>Description</b>	<b>FY2000</b>	<b>FY1998-2000</b>
Number of Unique Vendors Submitting	135	300
Number of Project Submittals	207	420
Number of Projects	8	14

## **2.1.2 THE TECHCON WEB SITE**

### **2.1.2.1 BACKGROUND**



The TechCon web site was established in 1996. Its purpose was to provide information about the TechCon program. The site contained five areas: 1) Overview, 2) Vendor Information; 3) Net Resources; 4) Procurement, and 5) Discussion List.

Today, the web site facilitates communication and interaction among stakeholders, DOE project teams, technology vendors, and regulators.

The site serves as an interactive tool for information management and communications among TA project teams and other interested parties. The successful evolution of the TechCon web site is indicated by a steady increase in the number of visitors. This number increases during specific technical assistance activities such as vendor forums or workshops. The figure below reflects December 2000, when two vendor forums were held.

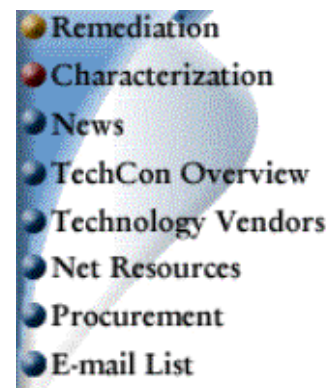


### 2.1.2.2 WEB SITE STRUCTURE

#### Home Page (<http://web.ead.anl.gov/techcon/>)

The current TechCon Home page is designed to facilitate navigation for project teams and technology vendors. As seen from the navigation bar (at right) the primary focus is on remediation and characterization projects; however, additional areas of interest to project teams and vendors may include:

- News – chronological listing of news items sent to its subscribers
- TechCon Overview – describes TechCon program, it's role in technical assistance and its affiliations
- Technology Vendors – information and access the Vendor Submittal Database
- Net Resources – links to relevant Internet sites
- Procurement – links to DOE procurement sites by Operation Office
- E-mail List – link to the subscribe area to receive news updates





The Remediation Projects area of the web site has supported TechCon's role in technical assistance that began with the INEEL Pits and Trenches project in FY1996. This section contains twelve current or completed remediation projects that have received TechCon technical assistance.

The site provides links to TA Project Home pages of the multiple remediation projects where alternative technology-based approaches are being evaluated to enhance the cost and performance components of DOE site remediation efforts. Vendors can access individual project sites for specific details, and submit capability statements and project histories about their company and technology. DOE project teams access the "View Capabilities" portion of the project web sites to obtain detailed information about vendors, their technologies, and experiences. This information enables the project teams to identify new or different alternatives.

Currently, there are project web sites for six active projects and six completed projects. The projects described in this year-end report include:

- Bookhaven: Peconic River Remedial Alternatives Workshop
- Portsmouth: Biotreatment of TCE in Groundwater
- Hanford 100-N Area: Strontium in Groundwater
- Hanford 200 Area: Carbon Tetrachloride in Groundwater
- Oak Ridge: DNAPL in Fractured Bedrock
- Paducah: TCE and Technetium in Groundwater



The Characterization Initiatives portion of the web site was initiated in FY 2000 and addresses the significant need for characterization technologies.

One of the major challenges to successful implementation and use of site remediation technologies is inadequate characterization data. Characterization that is part of the project's site assessment phase frequently lacks data needed for remedial design, particularly when vadose zone and groundwater remediation elements are involved.

The use of characterization technologies and techniques that minimize additional drilling and sampling are essential for meeting milestones and staying within budgetary limits. This part of the web site supports project activities by providing information about existing and emerging technologies and the experienced vendors who are able to satisfy remedial design characterization needs.



Currently, the site includes information on geophysical characterization initiatives and the Mound Site TA project on characterization through concrete walls and floors. Both TA projects are included in this report.

### Subscriber List



In FY 2000, TechCon initiated a subscriber list to facilitate information management and distribute news items to vendors, project teams, and stakeholders. Approximately 500 subscribers are currently in the list. News updates about TechCon as well as remediation and characterization project activities and status are sent on a weekly or biweekly basis.

Individuals accessing the TechCon Home page can subscribe or unsubscribe to this information by entering their email address.

### Project-Specific Web Sites

Two essential components of the TechCon web site are the Vendor Submittal Database and the TA Project web site. The Vendor Submittal Database is described in detail in Section 2.1.1. TA Project web sites are structured to facilitate communication and interaction among DOE project teams, vendors, community stakeholders, and regulators.

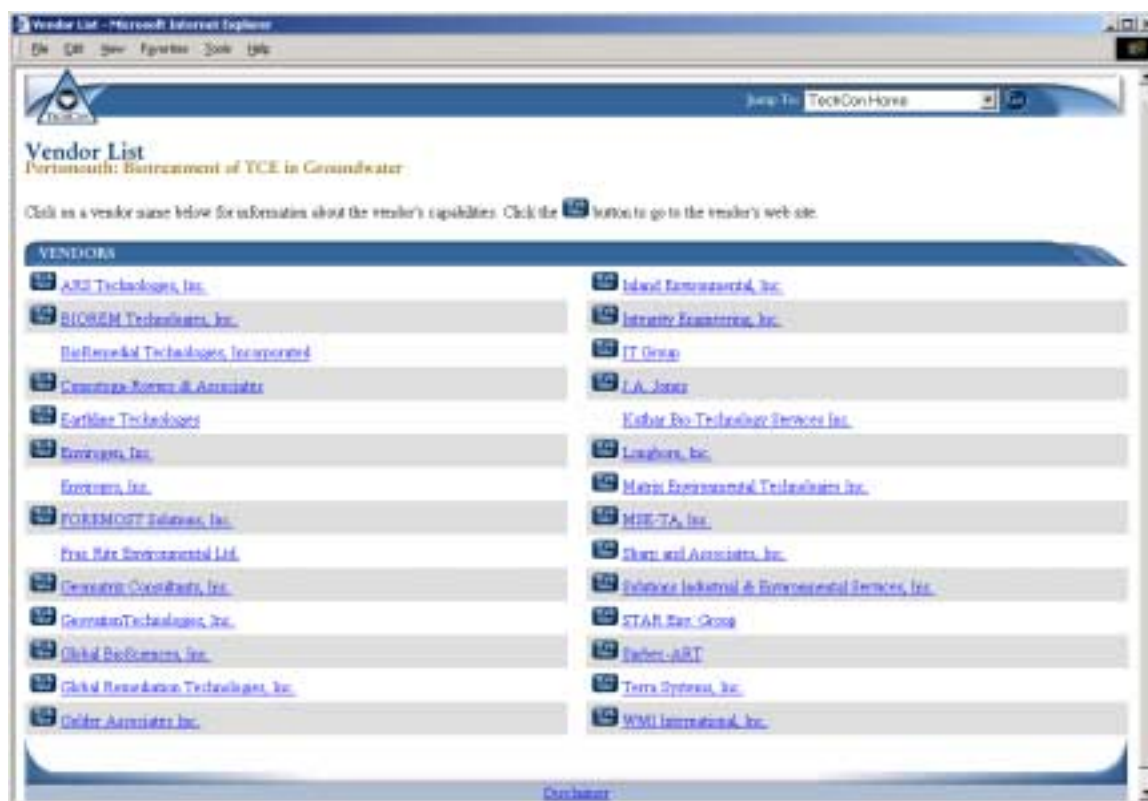
Organization of each project web site is illustrated in the figure to the right and contains the following information:

- Project Home Page – entry to the TA project provides an overview of the problem, expected changes, and identifies TA participants
- Project Status – a chronological listing of activities and milestones
- Project Description – a detailed description including site background, geology, hydrology, soils, contaminants.
- Technical Resources – information on technology alternatives, Internet resources, and resource documents
- Baseline Considerations – identifies the current project baseline including preferred remedies, costs and schedules
- Participation Information – provides participation guidance and includes sub-areas for data collection, data review and a discussion forum
- TAG Team – a password-protected area for the TAG to house restricted information that includes draft documents, and treatability data.





TA Project pages provide navigation tools to facilitate vendor interaction and updating of information. Ease in submitting and maintaining current information is critical to achieve vendor participation. The site is designed to encourage all participants to view the qualifications of these vendors. By clicking a project's "View Capabilities" button, visitors access a list of vendors who have submitted their capabilities. An example is illustrated below for the Portsmouth project.



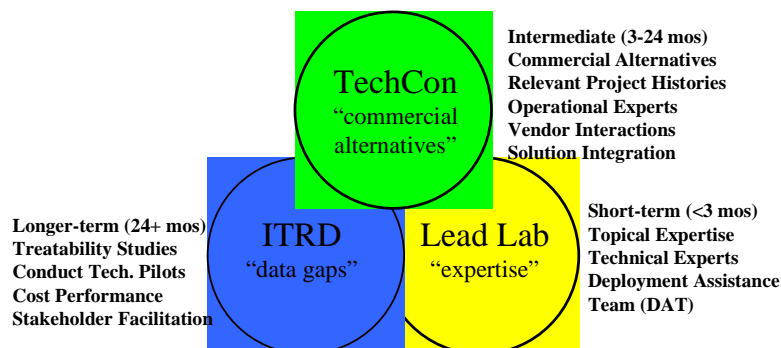
## 2.2 ADMINISTRATION OF TECHCON PROGRAM IN FY2000

The TechCon Program is administered by the Environmental Assessment Division of Argonne National Laboratory. The manager was A. Dale Pflug who has led the program since its inception in 1992. The program was responsible to Thomas Hicks, Technical Team Lead for the Subsurface Contaminants Focus Area during FY2000. The program structure includes project leads who conduct technology searches, maintain the TechCon database, and identify and screen vendor technologies. They prepare TA scopes of work; interact with vendors, TA project teams, and other stakeholders; direct reports produced for different phases of TA; and facilitate other project activities. Leads for active projects during FY 2000 were:

<b>Dale Pflug</b>	Hanford 100 Area Sr in Soil and Groundwater; Hanford 200 Area CCl <sub>4</sub> and Minimization of Infiltration for Hanford Single Shell Tanks
<b>Doug Gerrick</b>	Paducah TCE
<b>Michael Krstich</b>	Mound Characterization of Old Cave, Oak Ridge DNAPLs in Fractured Bedrock, Portsmouth Bioremediation of TCE, Non-Intrusive Characterization
<b>John Kupar</b>	Brookhaven Peconic River Alternatives

## 2.3 INTEGRATION OF TECHCON WITH OTHER EM TECHNICAL ASSISTANCE PROGRAMS

TechCon Technical Assistance is part of the integrated TA approach provided by SCFA and includes the ITRD and Lead Lab programs. Each has a separate and distinct role, although it is common for several of the programs to work together. The ITRD program has been selected to examine emerging technologies from DOE and other technology development programs while bringing TechCon in to identify and screen technologies from commercial vendors. For ITRD-led TA, TechCon participates as a member of the TAG. In other situations, TechCon has been selected to identify and screen alternatives that lead to selection of commercial technologies. This has resulted in ITRD-conducted pilot testing to establish cost performance expectations for a newly configured approach. Lead-Lab expertise from the national laboratory system may complement the expertise and perspective available from commercial or emerging technology sources.



## 3.0 TECHCON TECHNICAL ASSISTANCE PROJECTS

This section describes the TA projects led by TechCon during FY2000. Detailed information is provided at <http://web.ead.anl.gov/techcon/>. Technical Assistance projects led by ITRD or the Lead Lab programs and supported by TechCon are included in Section 4.0.

## OAK RIDGE

### 3.1 DNAPL IN FRACTURED BEDROCK AND CARBON TETRACHLORIDE IN GROUNDWATER AT THE Y-12 PLANT

#### 3.1.1 BACKGROUND



Figure 1. Aerial view of Y-12

The Oak Ridge Reservation (ORR) (Figure 1) is on the Environmental Protection Agency's national priorities list and is being cleaned up under a federal facilities agreement with the U.S. Environmental Protection Agency (EPA) and the State of Tennessee. The ORR includes three major installations: Oak Ridge National Laboratory (ORNL), the Y-12 Plant (as illustrated in Figure 1), and the East Tennessee Technology Park (ETTP, formerly the K-25 Site).

The Upper East Fork Poplar Creek Characterization Area (UEFPC CA) contains the developed Y-12 Plant industrial areas, including waste processing, storage, disposal areas, and groundwater that extends off-site into Union Valley. The groundwater in the Upper East Fork Poplar Creek (UEFPC) watershed, which is part of the Y-12 Plant installation, contains carbon tetrachloride ( $\text{CCl}_4$ ) in quantities greater than permitted by Environmental Protection Agency (EPA) regulations for drinking water sources. The source of this  $\text{CCl}_4$  is considered to originate from the dense non-aqueous phase liquids (DNAPLs) contained in the fractured bedrock underlying an area of the Y-12 Plant.

Groundwater movement within the UEFPC CA is controlled by the nature of the geologic units underlying the CA and the hydrogeologic properties of the units (Figure 2). In addition, anthropogenic changes to BCV during Y-12 Plant construction and present-day plant operations influence groundwater flow. On a UEFPC CA-wide scale, groundwater movement in the unconsolidated zone is generally toward UEFPC. An active zone of flow is

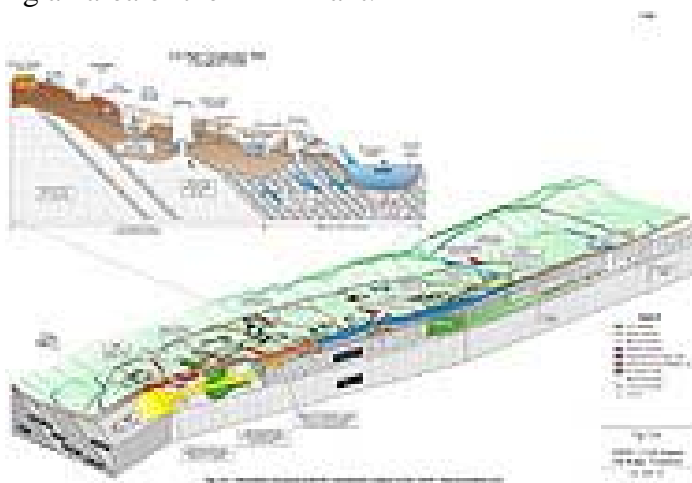


Figure 2. Conceptual model for contaminant transport in UEFPC CA.

usually present along the interface between the unconsolidated zone and bedrock. Because of its ability to rapidly carry groundwater to the east through dissolution features, the Maynardville Limestone acts as a hydrologic drain for the Y-12 Plant.

The origins of these groundwater contaminants stem from accidental releases of chlorinated solvents, most notably  $\text{CCl}_4$ , tetrachloroethene (PCE), and trichloroethene (TCE) from process operations at the Y-12 Plant. Approximately 38 million liters (10 million gallons) of  $\text{CCl}_4$  was used between 1943 and 1946 as part of the electromagnetic uranium separation process. Quantities of  $\text{CCl}_4$  used after 1946 decreased significantly, with primary use being laboratory applications and dry cleaning. An estimated 265,000 liters (70,000 gallons) per year of PCE were used between 1970 and 1987 in degreasing and machining operations. No estimates of the amounts of TCE used at the Y-12 Plant are available: TCE was used as a machine coolant, plasticizer, and degreaser.

DNAPLs at the UEFPC CA, including  $\text{CCl}_4$ , PCE and TCE, are slightly soluble in water and can partition into gaseous, solid (i.e., sorbed), and aqueous (dissolved) phases. In addition, these compounds, in either immiscible or dissolved-phase form, may sorb onto soil and/or rock surfaces or diffuse into the bedrock matrix. Once released, the infiltration of DNAPLs into the subsurface at the UEFPC CA is driven by gravity, which pulls the DNAPLs downward, and is opposed by viscosity and capillary forces, which retard migration. Properties of the DNAPLs, subsurface media (soil or rock), and groundwater control these forces (Figure 3). Properties of the DNAPLs that control its migration include density, viscosity, and interfacial tension with water. Properties of subsurface media that control DNAPL migration include pore size, pore geometry, and macropores in the soil, as well as structural heterogeneities, fracture aperture and orientation, mineralogy, and intrinsic permeability in the bedrock.

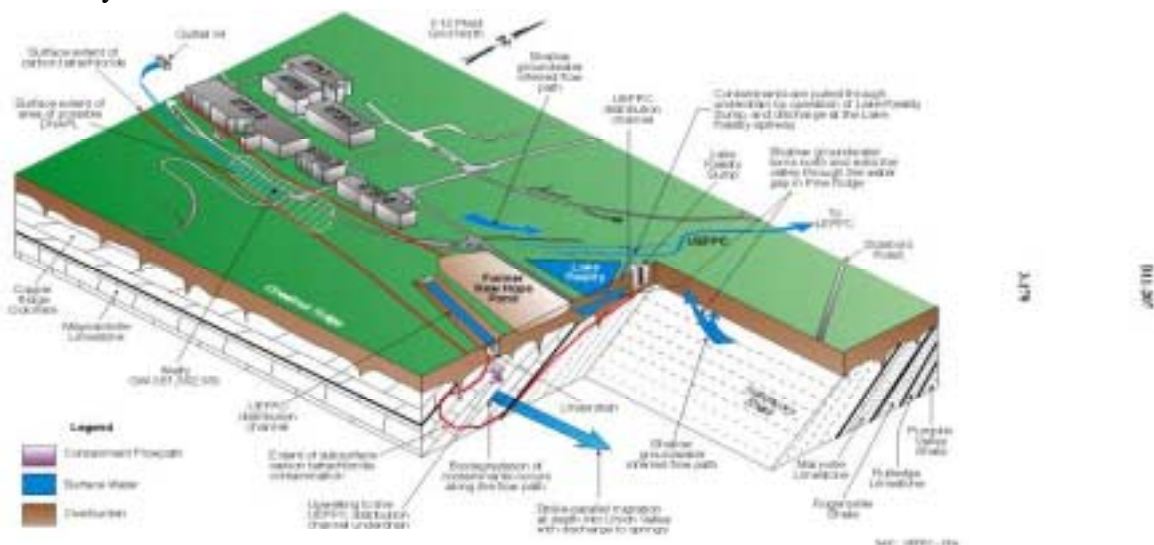


Figure 3. Conceptual model for the eastern plant area carbon tetrachloride signature.

Although no direct evidence of DNAPLs exist at the site (i.e., no free-phase product has been observed in groundwater monitoring wells), volatile organic compounds (VOCs) have been detected at concentrations (in excess of 1 percent of solubility limits) that are indicative of several DNAPLs source areas within the UEFPC CA. In general, DNAPLs are difficult to detect, and where present, are likely to significantly limit the effectiveness of groundwater remediation programs. The DNAPLs problem at the UEFPC CA is compounded by the impracticability of completely characterizing the nature and extent of groundwater contamination. Characterization is especially difficult in karst and fractured rock settings where subsurface heterogeneities and fracture patterns cannot be completely delineated. Additional challenges to site characterization result from the high density of active facilities in the vicinity of the groundwater contamination that interfere with characterization activities.

Because of low solubilities and low propensity for degradation, DNAPL contamination may present an exposure risk in the groundwater system for decades. Without removal or containment, DNAPLs may persist as a long-term secondary source of dissolved-phase groundwater contamination within the UEFPC CA.

### **3.1.2 PROJECT SCOPE**

ITRD initiated TA for this project in FY 1998. The project team was faced with a difficult problem of DNAPLs in fractured bedrock that was resulting in CCl<sub>4</sub>-contaminated groundwater at 500 below ground surface (bgs) that was day-lighting off the reservation. The project team requested TA from ITRD and TechCon to identify, evaluate, and implement technologies to 1) stop off-site migration of CCl<sub>4</sub>; 2) accelerate the treatment of CCl<sub>4</sub>-contaminated groundwater; and 3) treat the DNAPL source term.

To minimize cost and maximize direct interaction with the project team, TechCon provided project management for this joint effort. During FY 1999, ITRD-funded treatability studies were conducted for biostimulation (Envirogen) and bioaugmentation (ORNL). During this same time, TechCon constructed the project web site that was used for information management and soliciting bioremediation vendor input in the form of company capabilities and project histories. This integrated effort supported the EE/CA for Y-12 and the inclusion of bioremediation as a preferred remedy to augment pump-and-treat activities.

In FY 2000, DOE Oak Ridge Operations (DOE-ORO) and the Bechtel Jacobs Y-12 project team requested continued TA to support site efforts by identifying vendors and preparing for a pilot-scale bioremediation deployment in FY 2001. ITRD was tasked to maintain the TAG to support characterization, bioremediation, and modeling activities. TechCon was requested to maintain its project-specific web site to interface with commercial bioremediation vendors who would potentially receive an RFP for pilot-scale deployment in FY01. DOE-ORO estimates TA will be needed through FY02 to deploy one or more commercial bioremediation companies.



### 3.1.3 PROJECT HISTORY

<b>9/26/00</b>	TAG reviews need for additional wells; issues Conceptual Design Evaluation Table
<b>9/12/00</b>	Work begins on Treatability Study Work Plan (TSWP); initial draft scheduled for late November
<b>9/8/00</b>	INEEL ASTD Bioremediation project team meets with ITRD, TechCon, and Oak Ridge Y-12 Project Team to discuss pilot-scale bioremediation deployment at Y-12 during FY-2001
<b>8/17/00</b>	TAG conference call includes INEEL ASTD Bioremediation project team. Oak Ridge Y-12 Area is selected as third site for ASTD deployment in FY-2001.
<b>8/7/00</b>	TechCon releases enhanced web site for the Oak Ridge DNAPL Project
<b>8/4/00</b>	Bechtel Jacobs issues startup schedule for pump-and-treat system at Y-12
<b>7/15/00</b>	TDEC issues Draft SOW for Tracer Test in fall
<b>7/1/00</b>	ITRD funds continued support of Bioremediation Conceptual Design and Groundwater Modeling
<b>6/1/00</b>	TechCon conducts initial database search for bioremediation commercial vendors.
<b>6/1/00</b>	TAG Subgroups (Characterization, Modeling & Bioremediation) submit SOW to support conceptual design of a bioremediation pilot-scale study in FY-2001
<b>5/15/00- 5/16/00</b>	TAG meeting in Oak Ridge
<b>1/18/00</b>	Final reports for Bioaugmentation (ORNL), Biostimulation (Envirogen) and Groundwater Modeling (Jacobs Engineering) available on the DNAPL Project Web Site

### 3.1.4 PROGRESS DURING FY 2000

- Developed the project-specific web site, “DNAPL in Fractured Bedrock and Carbon Tetrachloride in Groundwater at the Y-12 Plant” located at <http://web.ead.anl.gov/techcon/projects/dnapl>. The site enabled communication with the project team, vendors, and interested stakeholders.
- Conducted a keyword search of TechCon and other technology databases, e.g., EPA REACH IT, RIMS 2000, GNET TechKnow, EPA CLU-IN, EPA ATTIC, and DOE CMST. One hundred eighty-four vendors were initially identified.
- Screened all technology vendors whose names turned up in the keyword search. Each record was reviewed using database information on the technology and vendor web sites to determine whether the technology was applicable to the specific site need identified by the TAG. The list was refined to 42 vendors.

- Contacted the 42 vendors identified during the screening process: each received an email describing the technology opportunities, then contacted by telephone for additional information.
- Gathered data on vendor capabilities and project histories related to DNAPL remediation. Forty-one vendors submitted their capabilities to the web site.
- Integrated the INEEL ASTD bioremediation resources into the path-forward for the Y-12 project. Collaborative technical assistance by ITRD, TechCon, and ASTD helped initiate development of the Treatability Study Work Plan.
- A similar TA was initiated at the Portsmouth site at the end of the year. Because of reduced budgets in 2001 at Oak Ridge, it is likely that deployment of bioremediation will occur at Portsmouth first. As a result, cooperation between the Oak Ridge and Portsmouth sites was initiated by TechCon.

The following Vendor List is taken from the “View Capabilities” page of the TechCon Y-12 project web site. The list identifies qualified, experienced commercial bioremediation companies that submitted their capabilities and relevant project experience to the TechCon web site. The list is a subset of the Vendor Submittal Database described in Section 3 and contains links to each company’s web site.





### **3.1.5 PLAN FOR TECHCON ACTIVITIES IN FY 2001**

- TechCon will integrate TA efforts between Portsmouth and Oak Ridge to identify bioremediation and delivery system vendors for pilot-scale bioremediation deployment in FY 2001 and FY 2002 at Portsmouth and Y-12.
- A Vendor forum is scheduled for December in Oak Ridge, Tennessee that will involve commercial bioremediation and delivery system vendors and project team representatives from the Portsmouth and Oak Ridge Sites.
- TechCon will continue facilitating interactions between the Y-12 project team and bioremediation and delivery system vendors.
- TechCon will use the project web site to facilitate information management among these vendors, the project team, and the TAG. Some of the available information in support of an FY 2002 pilot-scale deployment will include:
  - Treatability Study Work Plan scheduled for release in March 2001
  - Strategic approach for a phased installation of wells during FY 2001
  - Tracer test work plans and results
  - Fate and transport modeling activities

# PORTSMOUTH

## 3.2 BIOREMEDIATION OF TRICHLOROETHENE IN GROUNDWATER

### 3.2.1 BACKGROUND

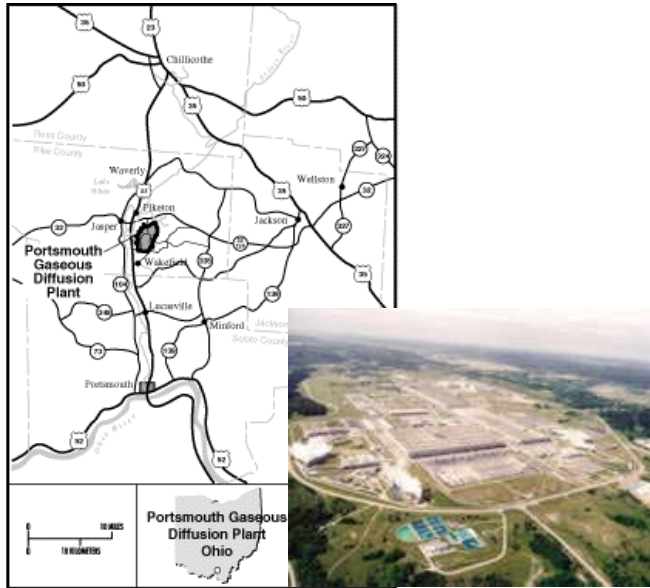
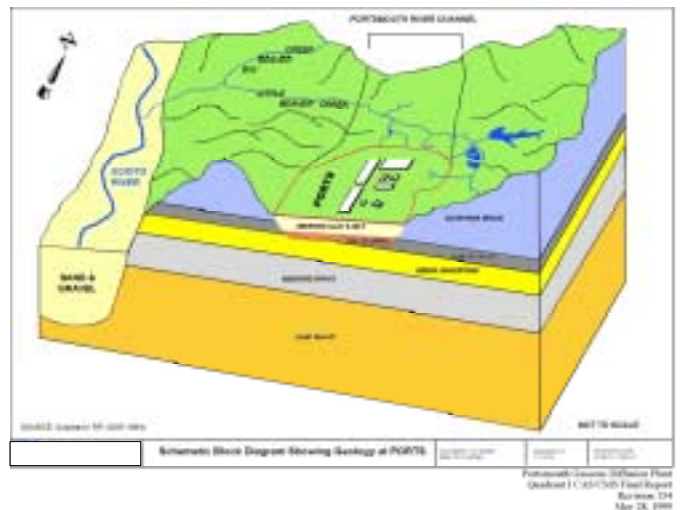


Figure 4. The Portsmouth site

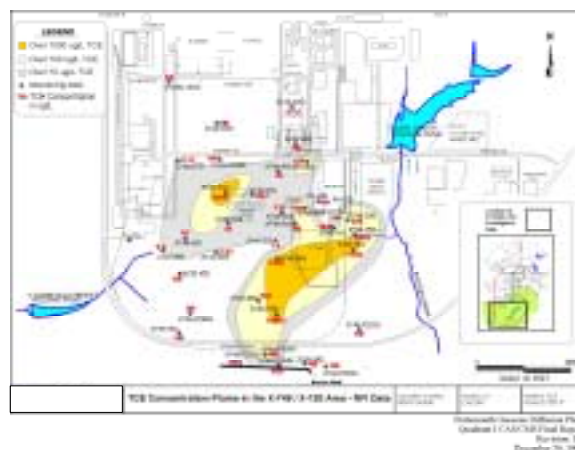
The Portsmouth Gaseous Diffusion Plant (PORTS) is owned by the U.S. Department of Energy (DOE). PORTS is approximately 80 miles south of Columbus, 20 miles north of Portsmouth, and 1 mile east of U.S. Route 23, near Piketon in south-central Ohio (Figure 4). Figure 1.2 shows an aerial view of the PORTS facility. The industrialized portion of PORTS is approximately 1,000 acres of a 3,714-acre DOE reservation. PORTS was constructed between 1952 and 1956 and has operated since January 1955 enriching uranium for electrical power generation. Until 1991, PORTS also provided highly enriched uranium to the U.S. Navy. The DOE-owned PORTS site has operated continuously since January 1955 and its principal process has been the separation of uranium isotopes by gaseous diffusion for  $^{235}\text{U}$  enrichment. The environmental restoration program at PORTS was initiated in 1989.

The geology of the PORTS facility (Figure 5) has been characterized through the drilling of over 1,600 borings and wells throughout the site. The near-surface geologic materials that influence the hydrologic system at the PORTS facility consist of several bedrock formations and unconsolidated deposits. The bedrock formations are Bedford Shale, Berea Sandstone, Sunbury Shale, and Cuyahoga Shale. The unconsolidated deposits of clay, silt, sand, and gravel compose the Minford Clay and Silt (Minford) member and the Gallia Sand and Gravel (Gallia) member of the Teays formation.



The investigation, study, and implementation of corrective actions in support of environmental restoration proceeded in a phased approach that divided the facility into quadrants. Quadrant I occupies the southern portion of the PORTS reservation. The boundaries of Quadrant I were established with respect to the surface water and groundwater flow and drainage patterns. Quadrant 1 contains the X-749/X-120 Area and Groundwater Plume.

The X-749/X-120 Area in Quadrant I contains a contaminant plume consisting primarily of TCE. The two sources of groundwater contamination that formerly existed in Quadrant I were the X-749 landfill and the site of the defunct X-120 Goodyear Training Facility. Although the X-749 and X-120 areas are no longer sources of contamination, the groundwater contains levels of TCE that are above the targeted risk level of  $1 \times 10^{-6}$ .



The X-749 Contaminated Materials Disposal Facility was used for the disposing of material contaminated with hazardous constituents and low-level radioactive waste. The northern portion of the landfill received waste contaminated with solvents, oil, and wastewater treatment sludge from 1955 through 1989. The primary contaminant of concern in groundwater in the X-749 Area is TCE, which is believed to have been released during the landfill's operational life. While the primary release pathway to groundwater has been through soils that lie beneath the unit, the X-749 landfill was capped in 1993 to prevent further leaching of contaminants from the vadose zone. The landfill is, therefore, not modeled as a continuing source of groundwater contamination.

The groundwater beneath the X-120 Goodyear Training Facility is contaminated with TCE. While TCE may have been released to groundwater during the operational life of this facility, the area is not modeled as a continuing source of groundwater contamination because soil data for this area indicate TCE is not present at concentrations exceeding the soil leaching value of 48 µg/kg.

One of the primary remedial alternative consists of a combination of injection of a compound to enhance bioremediation and the planting hybrid poplar trees in selected portions of the X-749/X-120 Area plume. The Preliminary Remediation Goal (PRG) for TCE in both the Berea and Gallia groundwater is 5 micrograms per liter (µg/L).

### 3.2.2 PROJECT SCOPE

In September 2000, the TechCon Program agreed to provide TA to the Portsmouth DOE and Bechtel Jacobs project teams. TechCon was asked to identify bioremediation and delivery system technologies and vendors to treat TCE-contaminated groundwater in a

shallow aquifer (30 feet below ground surface [bgs]) with low hydraulic conductivity ( $10^{-6}$  feet per second).

TechCon contacted the ITRD and INEEL ASTD programs to participate in the PORTS project. TechCon had been working with ITRD on the Y-12 project since 1998, and recently worked with INEEL to support the Y-12 effort. The collaboration was well suited to support PORTS.

TechCon organized a Vendor forum specifically focusing on bioremediation and delivery system commercial companies and constructed a project-specific web site similar to that for Oak Ridge (<http://web.ead.anl.gov/techcon/projects/dnapl/>). DOE Portsmouth requested that TechCon and ITRD work together in a manner similar to their approach at Oak Ridge. ITRD selected individuals from the Oak Ridge TAG to identify data gaps, subsequent informational needs, and support bioremediation and modeling activities.

DOE Portsmouth estimated that TA from TechCon, ITRD, and the Lead Lab programs would be needed through FY 2001 to achieve deployment of one or more select bioremediation and delivery systems.

### **3.2.3 PROJECT HISTORY**

- 9/8/00** Initial Meeting with Portsmouth DOE and Bechtel Jacobs project team
- 9/18/00** Formal Request by Portsmouth DOE for technical assistance
- 9/21/00** Meeting between Portsmouth project team and TechCon
- 9/28/00** Web site completed for Portsmouth: Bioremediation of Groundwater Contaminated with TCE

### **3.2.4 PROGRESS DURING FY2000**

TechCon established a project-specific web site: (<http://web.ead.anl.gov/techcon/projects/portsmouth/index.cfm>) where the project team, stakeholders, and commercial vendors could exchange information. TechCon then initiated a search for commercial vendors using the Technology Vendor Contact database developed and maintained by the TechCon Program. In addition, EPA, DOE, and commercial databases were reviewed. TechCon notified its email subscribers (more than 500 subscribers) about the bioremediation opportunity at the Portsmouth site.

The initial database search identified nearly 100 potential bioremediation and delivery system candidates. A detailed screening narrowed the field of candidate vendors to less than 50 and provided the basis for personal contacts and the solicitation of information. Commercial vendors with relevant experience were requested to submit their capabilities and relevant project history experience through the Portsmouth Project Site prior to November 22, 2000 as an invitation requirement to the forum scheduled for early December 2000.

### **3.2.5 PLAN FOR TECHCON ACTIVITIES IN FY2001**

- 10/13** Web site scheduled for release
- 10/16/00** Issuance of CBD Notice for commercial technology vendors
- 10/24-25/00** TAG meeting at Portsmouth
- 12/5-6/00** Vendor Forum at Portsmouth
- 1/15/01** Issuance of RFP for bioremediation company
- 4/1/01** Award of contract(s) for pilot-scale deployment/demonstration
- 5/15/01** Begin field activities

## MOUND

### 3.3 OLD CAVE – CHARACTERIZATION THROUGH CONCRETE WALLS AND FLOORS

#### 3.3.1 BACKGROUND



The Mound Plant (Figure 1) is located in Miamisburg, Ohio, approximately 10 miles south-southwest of Dayton, Ohio. The 306-acre Miamisburg Environmental Management Project (MEMP) is a Department Of Energy (DOE) closure site currently undergoing Decontamination and Decommissioning (D&D) activities before being turned over to City of Miamisburg for re-industrialization.

The Old Cave Project at the Mound Plant was designed for identifying potential physical and radiological hazards that may be encountered during removal of the Old Cave.

The Old Cave at Mound was constructed in the early 1950s and occupied an approximate 1,000-sq ft area located in the Semi-Works (SW) Building. This area was used to process radium (Ra-226) and actinium (Ac-227) from 1951 to 1955. This process resulted in significant contamination of the area and presented a radiological hazard to personnel. Knowledge of the physical and radiological status of the Old Cave area and its entombed contents serves the following purposes: 1. Determining the location of possible metal and non-metal objects and to confirm locations of footers, walls, and other boundaries in the building drawings. 2. Determining and mapping of the radiological constituents within the Old Cave area. 3. Assisting the project team in the development of a safe dismantlement plan. 4. Providing decision points to potentially support "down-grading" the containment area.

Deployment of non-intrusive characterization has commenced at the Mound Plant to accelerate the D&D activities associated with the Semi Works and Research (SW/R) Building, specifically the area known as the Old Cave. This area is entombed from previous Decontamination and Decommissioning (D&D) activities and requires removal. Exact radiological inventories and physical items within the entombment are unknown. Adequate documentation as to the actual radiological inventories of radium (Ra-226) and actinium (Ac-227) left in the Old Cave does not exist. Conservative estimates indicate that a maximum of 5 Curies of Ac-227 and 12 Curies of Ra-226 could potentially remain in the Old Cave.

The deployment of intrusive characterization technologies will be to provide additional radiological and physical data for determining the best approach for the Old Cave

removal. Once it is determined that this additional data is required, BWXTO will proceed with the Old Cave D&D in a safe and cost effective manner, while achieving the goals established for the closure of MEMP.

Selection and application of advanced technologies to both non-intrusively and then intrusively (if required) verify the radiological and physical condition inside and under the concrete entombment is scheduled for fiscal years 2000 and 2001.

### **3.3.2 PROJECT SCOPE**

DOE-OH requested TA from the TechCon Program to identify experienced commercial vendors for subsurface characterization through concrete walls and floors. TA supported the BWXTO (prime contractor) project team in identifying experienced commercial vendors with cost-effective characterization alternatives for the Old Cave Project. DOE-OH also requested that the services of ITRD and Lead Lab programs be available for follow-up.

TechCon was requested to construct a Project page (<http://web.ead.anl.gov/techcon/charinit/cave/>) to facilitate interaction between the project team and commercial vendors. TechCon posted a CBD Notice of a Request for Proposals seeking qualified source(s) to provide intrusive and non-intrusive geophysical characterization technologies to characterize hazardous, radioactive, and mixed waste contents entombed in the Old Cave at MEMP. The TechCon web site provided additional details and links to support documents and directions for submitting information. The web site was the only source used for preparing a List of Interested, Pre-qualified Sources. Vendors would receive an RFP, expected to be issued during the first quarter of FY 2001.

DOE-OH wants TA provided through the second quarter of FY 2001 for deployment of one or more commercial characterization companies. A Vendor Forum may be required in the first quarter of FY 2001.

### **3.3.3 PROJECT HISTORY**

- 1/20/00** A Mound Value Engineering Study suggested that alternatives to the Old Cave baseline-decommissioning plan could potentially result in significant project cost savings.
- 3/01/00** MEMP submitted an Accelerated Site Technology Deployment (ASTD) Proposal to the DOE National Energy Technology Laboratory (NETL) entitled, "Intrusive and Non-Intrusive Characterization through Concrete Walls and Floors."
- 3/30/00** ASTD Proposal funded by NETL
- 6/01/00** TechCon produces Interim Report on the "Minimally Invasive Characterization Companies"



- 6/05/00** Initial meeting with TechCon and DOE-OH and BWXTO project team to discuss TechCon's recent work with Geophysical Characterization companies identified on Characterization Initiatives portion of the TechCon web site
- 6/19/00** Gamma spectroscopy, Ground Penetrating Radar Gradient Magnetics,  
**7/15/00** and Electromagnetic Ground Conductivity characterization conducted on Old Cave as part of Phase I non-intrusive characterization activities
- 7/15/00** TechCon begins construction of Old Cave Project web site to support Phase II minimally invasive characterization activities.
- 8/01/00** Formal request by DOE-OH for TA to support the Old Cave Project
- 8/10/00** BWXTO issues CBD Notice for potential sources sought for upcoming RFP on Intrusive and Non-intrusive Geophysical and Radiological Characterization Technologies. The CBD was posted on the TechCon web site noting that information provided by the responders at the TechCon web site will be the only source used for the purpose of preparing a List of Interested, Pre-qualified Sources for the RFP.
- 8/10/00** TechCon begins contacting minimally invasive characterization companies to discuss upcoming opportunity and the process for submitting corporate capabilities and project histories
- 10/01/00** Closure date for RFP

### **3.3.4 PROGRESS DURING FY2000**

- Developed the project-specific web site, "MEMP Old Cave: Characterization Through Concrete Walls and Floors" (<http://web.ead.anl.gov/techcon/charinit/cave/index.cfm>)
- Conducted a keyword search of TechCon Database and other technology databases, (e.g., EPA REACH IT, RIMS 2000, GNET TechKnow, EPA CLU-IN, EPA ATTIC, and DOE CMST). 184 vendors were initially identified.
- Performed an initial screening of all technology vendors in the TechCon Contact database and links to vendor web sites to determine if the technologies were applicable to the project need. A list of 124 potential vendors was reduced to 46.
- Notified the 46 candidate vendors via email describing the opportunities, and telephone contact for additional information.
- Invited targeted vendors to submit their capabilities and project histories. 24 vendors submitted their credentials to the web site.



The following Vendor List is taken from the “View Capabilities” page of the Old Cave project web site. It identifies experienced commercial vendors who submitted their capabilities and relevant project experience. Details are available by visiting the web site.



### 3.3.5 PLAN FOR TECHCON ACTIVITIES IN FY2001

TechCon will provide TA to DOE-OH and the BWXTO project teams in their effort to deploy non- and minimally intrusive characterization technologies for the Old Cave Project. DOE-OH will also use the SCFA's ITRD and possibly the Lead Laboratory programs.

DOE-OH will expand its current TA for the Old Cave Project to the SW Building (that contains the Old Cave). TechCon will collaborate with DOE-OH, BWXTO and ITRD representatives to develop and deploy a field approach/strategy for subsurface accessing of soils and groundwater for characterization and remediation.

Planned activities for FY2001 will include:

- Search the database for technologies and commercial vendors in subsurface access technologies below buildings and issue a Vendor Alternatives report.
- Update previous database search for non- and minimally intrusive characterization technologies and issue an Alternatives report.
- Search the database for in-situ stabilization technologies and vendors in support of the Old Cave path forward and issue an Alternatives report.
- Expand the Old Cave Project Home page to include new information for the SW Building.
- Collect additional qualifications for vendors experienced in subsurface access below buildings and in-situ and issue a Vendor Capabilities report.
- Conduct a Vendor workshop at the MEMP on subsurface access technologies and non- and minimally intrusive characterization technologies and issue Proceedings.

## BROOKHAVEN NATIONAL LABORATORY

### 3.4 PECONIC RIVER REMEDIAL ALTERNATIVES WORKSHOP

#### 3.4.1 BACKGROUND

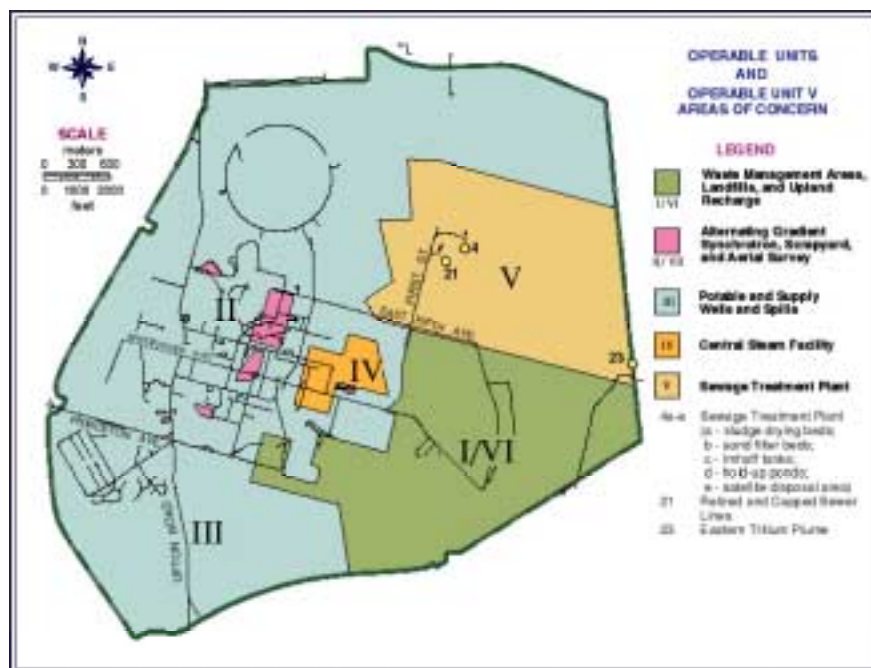


Figure 1. Aerial View of BNL

Brookhaven National Laboratory (BNL) is located in Upton, Suffolk County, New York near the geographic center of Long Island, 60 miles east of New York City. The BNL property is roughly square in shape with approximately three miles on each side, encompassing 5,265 acres (Figure 1). The developed area includes the primary BNL facilities located near the center of the site. These facilities cover approximately 900 acres. Outlying facilities occupy approximately 550 acres. In 1980, the BNL site was placed on the New York State Department of Environmental

Conservation (DEC) list of Inactive Hazardous Waste Disposal Sites. In 1989, it was included on the U.S. Environmental Protection Agency's (EPA) National Priorities List of Superfund sites. BNL's inclusion on the Superfund and DEC lists was primarily due to the effects of past operations that have affected groundwater in the vicinity of the laboratory.

BNL has 29 Areas of Concern. To ensure effective management these areas were grouped into five distinct Operable Units (Figure 2). Operable Unit V consists of three

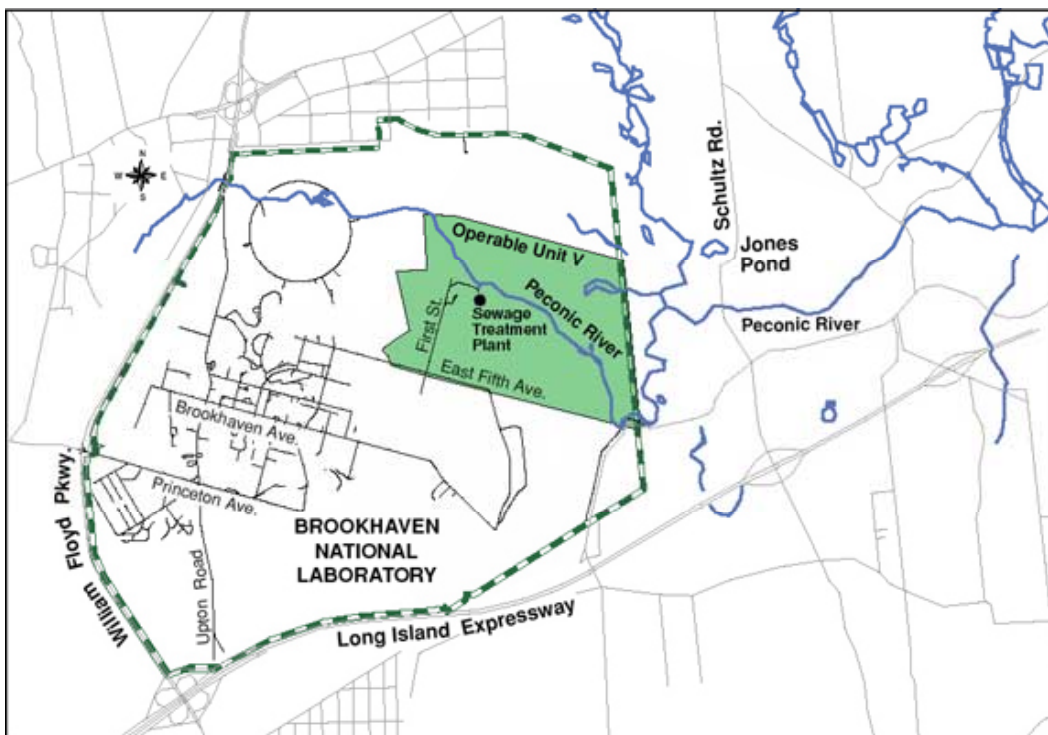


Areas of Concern: the Sewage Treatment Plant (STP) (AOC 4, Figure 2); Sewer Lines within the Operable Unit (AOC 21); and the Former Eastern Tritium Plume (AOC 23). STP AOC includes the Peconic River sediment and surface water, the soils in the area of the Sand Filter Beds, Hold-up Ponds, and the Satellite Disposal Area. The Peconic River receives discharge from BNL's STP. An aerial view of the STP is shown in Figure 3.

Figure 4 illustrates the relationship of the STP outfall and the Peconic River. The STP processes an average of 0.72 million gallons per day (MGD) or 2.7 million liters per day (MLD) during non-summer months and 1.25 MGD (4.7 MLD) during summer months. Treated effluent is discharged into the Peconic River, just north of the STP. During the remedial investigation, elevated levels of heavy metals (such as mercury, copper, and silver), organic chemicals (such as polychlorinated biphenyl's, or PCBs), and low levels of pesticides (such as



DDD, a product of DDT degradation) and radionuclides were detected in Peconic River sediment. Most of the contaminants were found in the top six inches of the sediment. Contaminants are more prevalent in areas where more sediment is deposited by the river and decrease with distance down river.



Based on an evaluation of the alternatives in the original Feasibility Study, the DOE proposed that the best alternative (baseline) for sediment cleanup was the excavation of all Peconic River sediments containing contaminant levels higher than cleanup goals. The excavated sediments would be dewatered in drying beds and disposed of off site. The public comment period on the OU V Proposed Plan closed on May 15, 2000. In response to community input, DOE has decided to divide the OU V project into two segments. The cleanup of less controversial areas, such as the sewage treatment plant, will go ahead. The DOE decided to postpone its decision on remediation of the Peconic River sediments because of community concerns over the necessity of excavation and potential adverse impact to the Peconic River wetlands. Specific concerns included:

- Consider how the excavation may disrupt the ecosystem.
- If excavation is chosen, care must be taken to prevent the spread of contamination from windblown dust or from sediments being washed downstream.
- Leaving the contaminated sediment in place will cause less damage than excavation.
- The river should be restored to as pristine a state as possible via the most effective methods.
- Phytoremediation should be evaluated more extensively, using different criteria than those in previous studies.

Based on these concerns, BNL requested TechCon TA to further evaluate sediment cleanup alternatives by drawing on a broader range of commercial vendor resources to insure that all viable alternatives are considered.

### **3.4.2 PROJECT SCOPE**

In July 2000, DOE-BNL requested TA in the identification and review of alternative approaches for remediating the Peconic River sediments. This would be accomplished in three phases: collecting data on vendor experience and expertise, interaction of selected resources in a Remedial Alternatives Workshop, and follow-up to action items arising from the workshop. Technical Assistance will combine BNL DOE and contractor resources and key resources from the regulatory and private sector to define the opportunities and deploy the best alternatives. TechCon would facilitate interaction among BNL site representatives, private sector vendors experienced in similar projects, subject experts, and community and regulatory stakeholders as a part of a workshop. The Internet would be used to gather data and provide the basis for selecting vendor participants. The areas of interest identified from the TechCon database search would include:

- sediment removal and handling technologies
- wetlands remediation and construction
- phytoremediation
- other remediation technologies with relevant project histories
- decision support tools such as modeling, visualization, and cleanup level determination

The following tasks are included:

- Establish an MOU for TA between the BNL Operable Unit 5 project team and TechCon.
- Establish an Alternatives workshop planning committee involving community and regulatory stakeholders.
- Establish a Peconic River Remedial Alternatives web site.
- Identify and select vendors with relevant experience and expertise.
- Select and invite workshop participants.
- Conduct a Remedial Alternatives Workshop; prepare and distribute Proceedings.
- Determine TA requirements for potential deployment.

### **3.4.3 PROJECT HISTORY**

8/09/00	Initial inquiry from DOE-BNL
9/7/00	Request for technical assistance from TechCon
9/8/00	Submittal of scope of work
9/14/00	Initial site meeting with DOE-Brookhaven Group
9/27/00	Conference call - workshop scope
9/27/00	MOU signed between DOE-Brookhaven Group and TechCon

### **3.3.4 PROGRESS DURING FY2000**

TechCon's efforts in FY 2000 centered on identifying potential alternative commercial technologies that could be applied to the treatment of contaminated sediments. These technologies were evaluated against the current baseline approach of excavation. The initial search identified more than 80 vendors who met the screening criteria established by TechCon and the DOE-BNL project team.

Later in FY 2000, the project team began developing the Peconic River Remedial Alternatives Project web site scheduled for completion in October 2001.

### **3.4.5 PLAN FOR TECHCON ACTIVITIES IN FY2001**

10/3/00	Conference call - workshop schedule and organization
10/13/00	Peconic River Remedial Alternatives web site (release for use)
10/16/00	Issue CBD Notice of workshop and data collection
11/10/00	Complete data collection of project histories
11/21/00	Steering Committee selects final workshop participants
12/12-13/00	Peconic River Remedial Alternatives Workshop
1/18/01	Peconic River steering committee meeting
2/22/01	Workshop Proceedings published on web
4/6/01	OU-5 project team completes PRAP
8/31/01	OU-5B Record of Decision signed



## MINIMALLY INTRUSIVE CHARACTERIZATION

### 3.5 MINIMALLY INTRUSIVE CHARACTERIZATION TOOLS

#### 3.5.1 BACKGROUND



DOE has a tremendous need to characterize hazardous and radioactive chemicals in soil, bedrock and groundwater. The standard method for subsurface characterization of contaminants is to directly sample the soil and groundwater and perform

laboratory analyses of the samples. This type of protocol is expensive, labor intensive and only allows for contaminant plume delineation derived from point-source sampling.

One of the major challenges to the successful implementation and use of site remediation technologies is inadequate characterization data. Characterization work, that is part of the project's site assessment phase, frequently lacks data needed for remedial design, particularly when vadose zone and groundwater remediation elements are involved. In completed projects and in all of the technical assistance projects currently undertaken by ITRD and TechCon, characterization has emerged as a major issue and obstacle to evaluating and selecting remediation technologies.

The Characterization Initiatives web site was launched in FY1999 to provide input to each of the active projects. To respond to many of the sites' needs for subsurface characterization as identified in DOE's Needs Management System (NMS), TechCon structured a portion of its web site to accommodate project-specific information on characterization activities. In addition to minimally invasive technologies, there were also a number of techniques and practices such as Adaptive Sampling that use geo-statistical and other techniques. These frequently will have to be integrated into workable tools that yield characterization data.

As a result of the TechCon data collection effort, a number of characterization technologies were identified vendor submittals concerning active or completed projects. Some were being applied in the private sector, but questions were raised about their validity.

Information gathered at the TechCon web site was communicated to the TA project teams, creating significant interest and skepticism. At that time, TechCon was conducting a Vendor Forum on the Mercury in Soil at Oak Ridge (see project information at <http://web.ead.anl.gov/techcon/projects/mercury/>).

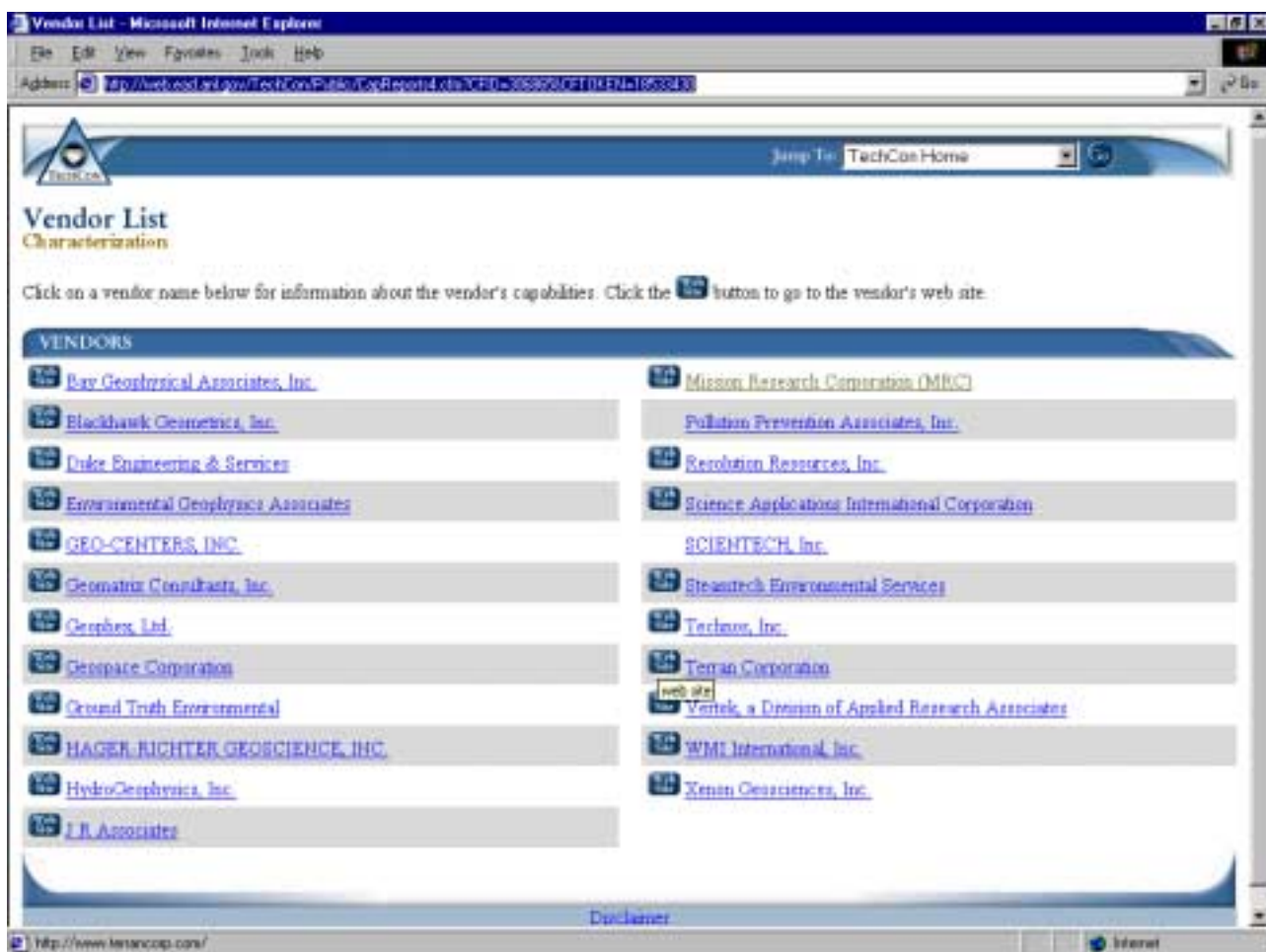
Because of significant potential benefit, two vendors were selected to conduct validation tests at multiple sites. The Ashtabula, Fernald and Oak Ridge sites had projects where

field characterization was either available or would be available in the coming year to enable verification. The sites funded testing of the two technologies.

### 3.5.2 Minimally Invasive Characterization Vendor Submittals

The following list is taken from the “View Capabilities” portion of the TechCon web site Characterization Initiatives page. The list identifies qualified experienced commercial vendors in non- and minimally intrusive geophysical characterization who submitted capabilities and relevant project experience to the TechCon web site. This list was initially used to support the Phase I non-intrusive characterization effort for the Old Cave Project at the DOE Mound site. The list is a subset of the TechCon Vendor Submittal Database and contains links to each company’s web site, capabilities, and project histories accessible at:

<http://web.ead.anl.gov/TechCon/Public/CapReports4.cfm?CFID=306865&CFTOKEN=18533430>





### 3.5.3 PMRAM TECHNOLOGY

Passive Magnetic Resonance Anomaly Mapping (PMRAM™) is a non-invasive technology for characterizing the subsurface environment without the need for soil borings or monitoring wells. PMRAM™ is a passive technology (no generation or propagation of a signal into the subsurface) that continuously measures magnetic resonance anomalies associated with subsurface lithology, geology, groundwater, geologic structure (e.g. faults and fractures) and the presence and distribution of natural and anthropogenic chemicals. The technology reportedly measures changes in the natural magnetic field of the earth using bioreceptors aided by a neurotechnical complex. These principles have not been reported previously in the U.S. but have been used in petroleum exploration and environmental applications in the Ukraine and described in anecdotal comment in characterizing U.S. private sector sites.

#### 3.5.3.1 PROJECT SCOPE

Four DOE validation tests of the PMRAM™ technology were conducted at three of its sites in the DOE Complex: Oak Ridge East Tennessee Technology Park (ETTP), in Oak Ridge, Tennessee, Fernald Environmental Management Project (FEMP) in Cincinnati, Ohio and Ashtabula Environmental Management Project (AEMP), in Ashtabula, Ohio.



Although the objectives of each test were site specific, the overall objectives were to determine if the technology could effectively characterize the following zones: (1) geology, (2) hydrogeology, (3) subsurface objects (e.g., buried drums), and (4) subsurface chemical contaminants (qualitatively and quantitatively). Characterization data derived using the PMRAM™ technology and standard sampling and analysis methods were compared.

The test conducted at ETTP in June 2000 included the K-1070-A Burial Ground and Groundwater Plume Area, the K-725 Beryllium Building Slab, and the K-770 Scrap Metal Yard. Although ETTP tests addressed all four zones of subsurface characterization, only geological and hydrogeological data were available in FY00. Tests conducted at the FEMP Incinerator Pad in July 2000 focused on Uranium (U) and Perchloroethylene (PCE) in the upper 20 feet of soil. Two tests were conducted at the AEMP in January and July 2000.

### 3.5.3.2 PROJECT HISTORY

- 10/15/00** TechCon facilitates meeting in Oak Ridge with DOE and Bechtel Jacobs EM-40 and EM-50 personnel on PMRAM technology. Interest was generated in potential application at Oak Ridge. The site agreed to fund an initiative by DOE and Bechtel Jacobs to test the technology during FY2000.
  
- 1/19/00** The Ashtabula Environmental Management Project (AEMP) conducted a field test of PMRAM in the soils beneath and in the vicinity of the concrete slab of the Northwest Warehouse. The primary goal was to map the contaminants of concern: uranium, technetium, and TCE.
- 1/24/00**
  
- 4/30/00** Final report on AEMP test issued by PMRAM vendor and subsequently validated by site personnel.
  
- 6/26/00-** Oak Ridge Operations Office conducted a field test of the PMRAM technology
- 7/10/00** at the K-1070-A Burial Ground, K-725 Beryllium Building Slab, and K-770 Scrap Metal Yard sites.
  
- 7/12/00-** The second technology test at AEMP was performed within the vicinity of the
- 7/14/00** CAMU area.
  
- 7/18/00-** The Fernald Environmental Management Project conducted a field test of
- 7/19/00** PMRAM at the incinerator pad within Area 3A. The contaminants of concern for this demonstration are uranium and tetrachloroethene. This location was selected because of varying surface coverings, a variety of contaminants, the range of concentrations, and extensive characterization data on the subsurface contamination.
  
- 9/11/00** A Data Report on PMRAM tests at the three DOE sites submitted for ASME review
  
- 9/19/00-** ASME Peer Review of PMRAM tests at the three DOE sites. Review was held
- 9/20/00** in Columbia, MD. Results were to be reported in early FY01.

### 3.5.4 EMR<sup>TM</sup> TECHNOLOGY

Radiography is an enhanced version of ground penetrating radar. Like many scientific discoveries, Electromagnetic Radiography (EMR)<sup>TM</sup> came into existence as a result of experimental observations. It was discovered that various chemical contaminants in the subsurface produced unique and specific EMR responses. In the spring of 2000, Sandia National Laboratory, under DOE sponsorship, performed theoretical studies to demonstrate that entirely new and previously unknown physical effects were occurring at the quantum level. These molecular responses—as opposed to changes in the bulk physical properties of the ground—are the basis for Electromagnetic Radiography (EMR).

#### **3.5.4.1 Project Scope**

On September 27-29, 2000, the EMR vendor surveyed designated areas at Buildings 81-10 and 9201-2 for using EMR™ in non-invasive characterization of mercury-contaminated soils. The survey was conducted according to the requirements of Bechtel Jacobs Company. Sampling of the area survey is expected in FY2001 to confirm performance of the technology.



#### **4.0 ITRD TECHNICAL ASSISTANCE PROJECTS SUPPORTED BY TECHCON**

The following projects were led by ITRD during FY 2000. TechCon provided technical representation on the Technical Advisory Groups and supported the projects by identifying vendors with relevant experience in the technology areas being evaluated. This was communicated at ITRD TAG meetings and posted on project web sites.

## 4.1 STRONTIUM IN GROUNDWATER

### 4.1.1 BACKGROUND



The Hanford 100-N Area is a 1.6-square-mile area situated in the northern part of the Hanford Site adjacent to the Columbia River, and is the site of a reactor that operated from 1963 to 1987. Nine water-cooled, graphite moderated plutonium production reactors were constructed between 1943 and 1963. Through 1983, all the cooling water was discharged into the 1301 crib and trench, and beginning in 1983, an additional 400 gpm was discharged into a second crib. Discharges to one crib ceased in 1985 and the other in 1991. Operations and leaks from the fuel rods contaminated the cooling water with plutonium, cesium,

cobalt, and strontium. These contaminants ended up in the soil and groundwater underneath the two discharge trenches.

### 4.1.2 TECHNICAL ASSISTANCE

The ITRD Program established a TAG in March 1998 to investigate and recommend strategy and technology alternatives for final remediation of strontium (Sr-90) in groundwater and soil. Technical Assistance continued through FY2000. The TAG consists of site project engineers and managers, regulatory agencies, and community stakeholders who were seeking reduction of contaminants through containment, treatment, and/or stabilization of contaminated soil and groundwater. TechCon has been a TAG member since the project started, with the role of identifying and documenting commercial characterization and remediation technologies for consideration by the TAG. Little technical data or technology project information is available from commercial technologies of interest including impermeable barriers, soil flushing, stabilization, phytoremediation and natural attenuation. Characterization emerged as a major issue blocking identification and evaluation of individual technologies.

TechCon established a web site in FY1999 to gather relevant vendor operational data and provide a communications tool between the TAG and vendors of interest. The project web site (<http://web.ead.anl.gov/techcon/projects/gwater/>) was maintained during FY 2000. New vendor submittals were received during the year. Because of internal TAG activities in modeling and report generation, no vendor forums were considered during the period. TechCon facilitated interactions with individual characterization and remediation technology vendors during the TAG meetings.

TechCon will continue supporting the TAG in FY2001. Anticipated activities include completion of the Remediation Options Evaluation Report and Modeling studies. Other possibilities include establishment of a Performance Evaluation Group and technical oversight of treatability studies. Additional information on the ITRD 100 Area may be accessed by viewing the ITRD FY2000 Annual Report at <http://www.envnet.org/scfa/annlrpts.htm>.

#### 4.1.3 Vendor Submittals

The following list is taken from the “View Capabilities” page of the TechCon web site for the Hanford 100 N Area project. The list identifies qualified experienced commercial vendors in groundwater remediation who submitted their capabilities and relevant project experience. By accessing the web site, visitors can access links to each vendor’s web site and view their capabilities and project histories.

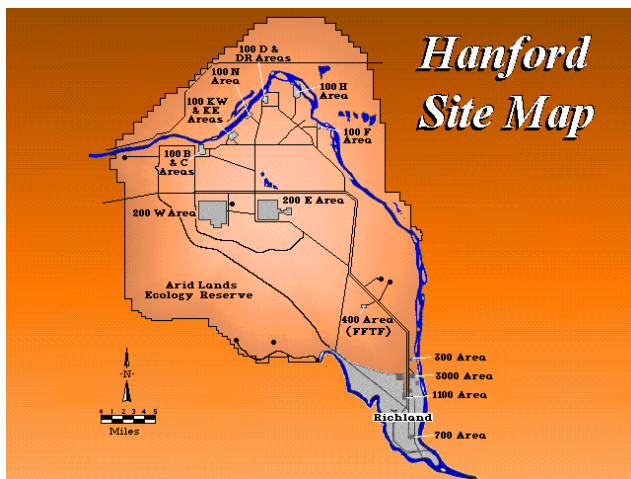




## HANFORD 200-N AREA

### 4.2 CARBON TETRACHLORIDE IN GROUNDWATER

#### 4.2.1 BACKGROUND



The Hanford site is located in southeastern Washington State. The central portion of the Hanford Site where the 200 East and 200 West Areas are located was used for chemical separation of plutonium, processing, and waste management. Soils within the vadose zone at 200-ZP-2 are contaminated with elevated concentrations of carbon tetrachloride. Concentrations of carbon tetrachloride, chloroform, and trichloroethylene in groundwater in the northern half of the 200 West Area exceed the regulatory limit. Current remedial actions for the

groundwater plume within operable unit 200-ZP-1 include pump-and-treat. There is a regulatory requirement for remediating the existing carbon tetrachloride plume, including suspected DNAPL that has contaminated the vadose zone and groundwater at this site and is moving towards the nearby Columbia River. Early waste disposal practices resulted in groundwater contamination levels exceeding federal drinking water standards of 5 ppb.

#### 4.2.2 TECHNICAL ASSISTANCE

The ITRD Program established a TAG in January 1999 to investigate and recommend technology alternatives for final remediation of carbon tetrachloride in the groundwater and DNAPL contamination. The TAG consists of site project engineers and managers, regulatory agencies, and community and regulatory stakeholders who are looking for commercial vendors capable of characterizing and/or remediating a CCl<sub>4</sub> contaminated groundwater plume. TechCon has been a member of the TAG since the project inception with the role of identifying and documenting commercial characterization and remediation technologies for consideration by the TAG. Little technical data or project information was available from vendors with technologies of interest including minimally intrusive characterization, bioremediation, and hydraulic containment. Characterization emerged as a major issue preventing identification and evaluation of individual remediation technologies.

TechCon established a web site in FY1999 to gather relevant vendor capabilities and project histories and provide a communications tool between the TAG and vendors of interest. The project web site (<http://web.ead.anl.gov/techcon/projects/ccl4/>) was maintained during FY2000. New vendor submittals were received during the year.

Because of internal TAG activities in modeling and report generation, no vendor forums were considered during the year. TechCon facilitated interactions with individual characterization and remediation technology vendors during the TAG meetings.

TechCon will continue to support the TAG in FY2001 and gather additional data as required by the project team. Anticipated activities will continue to use characterization tools and complete the characterization effort required. Additional information for this project may be accessed by viewing the ITRD FY2000 Annual Report at <http://www.envnet.org/scfa/annlrpts.htm>.

### 4.2.3 Vendor Submittals

The following list is taken from the “View Capabilities” page of the TechCon web site for the Hanford 200 N Area project. The list identifies experienced commercial vendors in groundwater remediation using characterization, thermal treatment, and bioremediation who submitted their capabilities and relevant project experience to the TechCon web site. The list contains links to vendor web sites and access to their capabilities and project histories.





## PADUCAH

### 4.3 TCE AND TECHNETIUM IN GROUNDWATER

#### 4.3.1 BACKGROUND



The Paducah Gaseous Diffusion Plant (PGDP) is an active uranium enrichment facility owned by the U.S. Department of Energy (DOE). Operations at the PGDP have resulted in waste streams common to many large industrial facilities namely chlorinated solvents. Since its initial operation in 1952, trichloroethene (TCE) has been used as a cleaning solvent to decontaminate equipment and waste material before disposal. Although various hazardous, non-hazardous, and radioactive wastes resulting from ongoing operations have been generated and disposed of at PGDP,

Technetium-99 (Tc-99) and TCE have been determined to be the most commonly occurring contaminants of concern within the groundwater plumes.

In 1988, TCE was detected off-site in residential wells exceeding the U.S. Environmental Protection Agency (EPA) maximum contaminant level (MCL) of 0.005 mg/L. Subsequent investigations led to the identification of two large groundwater plumes extending off-site. Remedial Action Objectives (RAOs) consist of groundwater-specific goals for protecting human health and the environment (EPA, 1988). Remediation scenarios under consideration at the PGDP include source reduction, containment, natural attenuation, and alternate concentration limits.

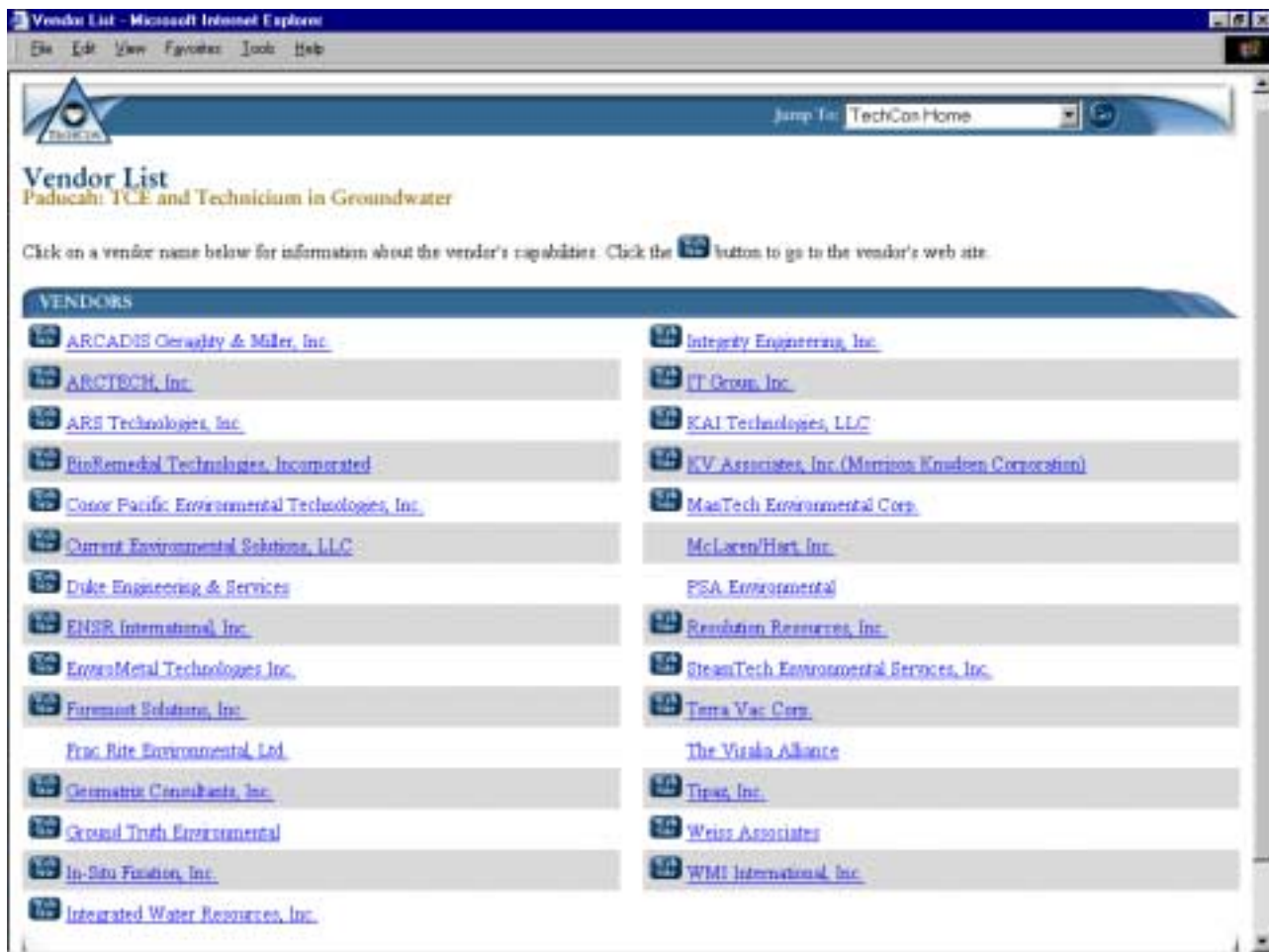
#### 4.3.2 TECHNICAL ASSISTANCE

The ITRD Program initiated this project in February 1999 to identify and evaluate technologies and strategies to provide source removal and prevent migration of contamination off-site. The Paducah project has three groundwater plumes contaminated with TCE and Tc99. The TAG was to investigate and recommend technology alternatives for remediation of two different zones associated with these groundwater plumes. TechCon was a member of the original TAG with the role of identification and documentation of commercial characterization and remediation technology-based alternatives. Technologies of interest included all minimally intrusive characterization technologies as well as deep soil mixing, thermal treatment, ozone injection, soil vapor extraction, and reactive walls. Characterization again emerged as a major issue blocking identification and evaluation of individual technologies. A Deployment Assistance Team that included Lead Lab expertise also visited the site during 1999 and validated the path-forward of the project. TechCon established a web site in FY1999 to gather relevant

vendor operational data and provide a communications tool between the TAG and vendors of interest. The project web site (<http://web.ead.anl.gov/techcon/projects/tce>) was maintained during FY2000. New vendor submittals were received during this year. Because of internal activities of the TAG in modeling and report generation, vendor forums were considered during the year. TechCon facilitated interactions with individual characterization and remediation technology vendors during the TAG meetings. TechCon will continue supporting the Paducah TAG in FY2001 and gather additional data as required in the project team decision-making process. Anticipated activities for the TAG will continue with efforts to use characterization tools, complete the characterization effort, and enable remediation strategies. Additional information for this project may be accessed by viewing the ITRD FY2000 Annual Report at <http://www.envnet.org/scfa/annlrpts.htm>.

### 4.3.3 Vendor Submittals

The following list is taken from the “View Capabilities” page of the TechCon web site for this project. The list identifies qualified experienced commercial vendors in groundwater remediation who submitted their capabilities to TechCon. The list is a subset of the TechCon Vendor Submittal Database and contains links to each company’s web site, their capabilities and project histories. The web site can be accessed at <http://web.ead.anl.gov/TechCon/Public/CapReports4.cfm?CFID=306865&CFTOKEN=18533430>



## PANTEX

### 4.4 HIGH EXPLOSIVES IN SOILS

#### 4.4.1 BACKGROUND



The Pantex Plant is located north of U.S. Highway 60, about 17 miles northeast of Amarillo, Texas (see Figure 1). The facility consists of 10,177 acres owned by the U. S. Department of Energy (DOE). In addition, 5,800 acres of land immediately south are leased from Texas Tech University for use as a safety and security buffer zone. Weapons assembly, disassembly, and stockpile surveillance activities involve short-term handling (but not processing) of tritium, thorium, uranium, and plutonium, as well

as a variety of nonradioactive hazardous and toxic chemicals.

Plant operations at the site include the fabrication of HE since the late 1950's. Process water generated primarily in Building 12-24N and 12-78 from the production operations flowed through a former wastewater treatment unit (WTU) located at Building 12-43, and was discharged to an adjacent unlined drainage ditch. Primary sources of HE contamination are the wastewater plume and sump overflows, wastewater piping and tank leaks, and the WTU effluent to the unlined ditch. Building 12-24N was used for HE fabrication from pressed or cast billets.

#### 4.4.2 TECHNICAL ASSISTANCE

ITRD has been providing technical assistance to the Pantex and LANL sites on high explosives since 1998. TechCon established web sites to support both of these projects in FY1999 and vendors were invited to provide input on their relevant capabilities and experience. Because of increased activity at other TA sites and a lack of interest in working with any of the vendors, the two sites were designated as complete in FY2000. ITRD and the Lead Lab are conducting additional work but TechCon has not identified further involvement at this time.

#### 4.4.3 Vendor Submittals

The following vendor list is excerpted from the "View Capabilities" page of the TechCon web site for the Pantex project. The list identifies qualified experienced commercial vendors in soil remediation who submitted their capabilities and relevant project experience to the TechCon web site. The list contains links to each company's web site and access to their capabilities and project histories. This web site can be accessed at

<http://web.ead.anl.gov/TechCon/Public/CapReports4.cfm?CFID=306865&CFTOKEN=18533430>

Vendor List - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Jump To: TechCon Home

## Vendor List

### Pantex High Explosives in Soils

Click on a vendor name below for information about the vendor's capabilities. Click the  button to go to the vendor's web site.

#### VENDORS

 <a href="#">A&amp;L Underground, Inc.</a>	 <a href="#">Geosafe Corporation</a>
 <a href="#">Active Environmental Technologies, Inc.</a>	 <a href="#">Global Environmental Engineering</a>
 <a href="#">ARCTECH, INC.</a>	 <a href="#">H&amp;H Eco Systems, Inc.</a>
 <a href="#">Benchmark Environmental Corporation, a ThermoFisher Company</a>	 <a href="#">Maha Research Foundation, Inc.</a>
<a href="#">Biochem Environmental</a>	 <a href="#">J R Associates</a>
 <a href="#">Biochem Technologies Inc.</a>	 <a href="#">Kekkoner Environmental, Inc.</a>
 <a href="#">BioRenewal Division, Microbac Laboratories, Inc.</a>	 <a href="#">Perma-Fix Environmental Services</a>
 <a href="#">BioSystems Technology, Inc.</a>	 <a href="#">QST Environmental (now ESE)</a>
 <a href="#">BSI Environmental, Inc.</a>	 <a href="#">Roy F. Weston, Inc.</a>
 <a href="#">CommScope Advanced Sciences, Inc.</a>	 <a href="#">Terra Vac Corp.</a>
 <a href="#">EFX Systems, Inc.</a>	<a href="#">TURR Corporation</a>
 <a href="#">Electronic Sensor Technology</a>	 <a href="#">Vista Research, Inc.</a>
<a href="#">Frac. Rate Environmental, Ltd.</a>	

[Disclaimer](#)



## MOUND PRS-66

### 4.5 PLUTONIUM AND THORIUM CONTAMINATED SOILS

#### 4.5.1 BACKGROUND



The Potential Release Site 66 (PRS-66) is an approximately 96,250 square foot historical disposal site located at the DOE Ohio Miamisburg Environmental Management Project (MEMP). The disposal site is located under a parking lot. Currently, most of the area is an asphalt parking lot constructed in 1984. PRS-66 was once a steep ravine, used for the disposal of construction soils and debris, including 10,000 to 15,000 empty drums that once contained  $^{232}\text{Th}$  and  $^{238}\text{Pu}$ . In addition to drums, other debris

such as concrete, washing machine, and a truck were buried at this site.

Excavation and landfill of approximately 33,000 cubic meters of contaminated soil from an area of PRS-66 with the highest levels of  $^{232}\text{Th}$  and  $^{238}\text{Pu}$  contamination was selected as the baseline remediation technology. The project team is looking for remedial alternatives to reduce the baseline cost associated with off-site disposal.

#### 4.5.2 TECHNICAL ASSISTANCE

In July 2000, the DOE-OH and BWXTO project teams requested TA from ITRD and TechCon to evaluate remediation alternatives for PRS-66. The ITRD Program initiated the TA process by establishing a TAG to investigate and recommend technology alternatives for final remediation of PRS-66. TechCon had been TA to DOE-OH and the BWXTO project team on the Old Cave characterization initiative, and was asked to support the evaluation of geophysical characterization alternatives that would be part of the TAG process. As a result, TechCon has been a member of the TAG since the project inception with the principal role of identification and documentation of commercial characterization and a secondary role relative to remediation technologies being considered by the TAG. The four areas of interest derived by the TAG early in the TA process included endpoint determination, geophysical characterization, soil washing, and excavation. TechCon will continue supporting the PRS-66 TAG in FY2001 as part of its overall TA approach to DOE-OH and other TA MEMP projects.

## 5.0 Other Technical Support

In addition to the ten TA projects, TechCon participated in other technical activities as members of the Deployment Assistance Team sent to Pantex and as technical support to the Phytoremediation Workshop. Additional information is provided below. TechCon also participated in the TIE Workshop at Savannah River and gave presentations on “Experiences and Strategies in Using Doe Technical Assistance” and “The Changing Nature of DOE Site Needs”.

### PANTEX

## 5.1 PROTECTING THE OGALLALA AQUIFER

### 5.1.1 BACKGROUND



Following the March 2000 announced discovery of trichloroethylene (TCE) in the Ogallala Aquifer, the Secretary of Energy directed the Office of Environmental Management to assemble a team of experts to aid the Pantex site in developing a response plan. The TCE contamination of concern was detected in the Ogallala Aquifer beneath the Burning Grounds in the northwestern part of the site.

To comply with the Secretary’s request, a technical assistance team was formed. The team was led by EM’s SCFA and supported by the SCFA Lead Laboratory team. Representatives from ITRD and TechCon also participated. The team met with personnel from Pantex March 20-24, 2000, to discuss current and planned activities to protect the Ogallala Aquifer.

### 5.1.2 TECHNICAL SUPPORT

TechCon sent a representative to participate as a team member in the week-long process of evaluating the discovery of TCE in the Ogallala Aquifer and developing a response plan. As part of this effort, a report was developed by the response team and issued on May 5, 2000 to the Secretary of Energy, Office of Environmental Management. The report, “Protecting the Ogallala Aquifer: Recommendations for Characterization of Trichloroethylene at the Pantex Plant Burning Grounds” is contained on Pantex web site at <http://www.pantex.com/RRoom/rrdocs/groundwater/finalem.pdf>. The primary findings include:

- Recommendation of a two-phase characterization effort

- Phase I activities would focus on rapid implementation of a range of characterization approaches in existing and new monitoring wells
- Phase II activities would depend on Phase I results
- These activities would focus on implementation of tools and detailed sampling strategies specific for particular pathways and transport mechanisms.



## PHYTOREMEDIATION WORKSHOP

### 5.2 WORKSHOP ON PHYTOREMEDIATION OF INORGANIC CONTAMINANTS

#### 4.5.1 BACKGROUND



The Metals & Radionuclides Product Line of the DOE SCFA is responsible for the development of technologies and systems that reduce risk and cost of remediating radionuclide- and hazardous-metal contamination in soils and groundwater. As part of SCFA's effort to address these responsibilities, the Workshop on Phytoremediation of Inorganic Contaminants was held at Argonne National Laboratory on November 30-December 2, 1999. The purpose of the workshop was to provide SCFA and the DOE ER Program with

an understanding of the status of phytoremediation as a potential technology for DOE sites.

The workshop was expected to identify data gaps, technologies ready for demonstration and deployment, and a set of recommendations. Workshop structure was organized as a brainstorming session consisting of a forum that facilitated communication between technical disciplines and levels of research and development. The workshop was comprised of invitation-only participants from DOE, EPA, USDA, DOD, academia, industry, and regulatory agencies.

#### 5.2.2 TECHNICAL SUPPORT

TechCon was requested to send a representative to participate in the three-day workshop that was organized into four primary areas: 1) Groundwater Applications; 2) Removal from Soils; 3) Stabilization and Sequestration; and 4) Monitoring. TechCon participated in the Removal from Soils (phytoextraction) discussion based on its experience in phytoextraction. The group was able to rank inorganic contaminants into four groups that included Readiness, Hyperaccumulators, Induced Hyperaccumulation, and Regulatory Acceptance. They also ranked the status of research for each category from "None" to "Commercial Application". Future research areas and key issues and recommendations were identified. Details of the workshop and its findings are contained in the "Proceedings from the Workshop on Phytoremediation of Inorganic Contaminants" available on the SCFA web site at <http://www.envnet.org/scfa/conferences/phyto2-00.pdf>. TechCon used the Workshop as an opportunity to interact with multiple commercial vendors who participated, and used insights gained to update the TechCon Contact Database.